D3.1 – Report on retrospective analysis of urban mobility governance

WP3 – Retrospective analysis of urban mobility governance

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

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Document Description

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Authors and involved institutions	Report edited by: Mario Diethart, Thomas Höflehner and Thomas Drage Authors: Marc Dijk (Maastricht University); Nicola da Schio (Vrije Universiteit Brussel); Mario Diethart, Thomas Drage, Thomas Hoeflehner, Friedrich Zimmermann (University of Graz); Roberta Castri, Francesca Cellina (University of Applied Science and Arts of Southern Switzerland)

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1. Introduction

Faced by a range of pressing ecological, societal and economic issues (such as climate change, air quality, congestion, etc.), cities are increasingly experimenting with new forms of governance and urban innovation. These projects often involve elements of participatory urban planning. Urban labs as institutional innovation can use co-design to carry out experiments in order to learn about new approaches to urban development (content) and urban governance (form/process). In the SmarterLabs project we set up and study four Living Labs focusing on issues of upscaling and social inclusion (WP4). In the *Report on literature review* (D2.1 & 2.2) carried out in WP2 we looked at the main bodies of literature that are relevant for our research in order to make broader conclusions concerning the challenges of social inclusion and upscaling of Living Labs. Based on these, WP3 seeks to learn about local specificities from past experiences with innovation projects in the four cities of Bellinzona, Brussels, Graz and Maastricht taking into account their local governance structure. The findings from the **literature review in WP2** and the **retrospective analysis in WP3** allow us to identify certain constraints to social inclusion and upscaling as well as ways to anticipate them (summarized in Chapter 6). The gathered knowledge is used to guide the action research and the design of the **Living Lab experiments in WP4**. They each have different approaches and goals and thus offer a wide range of possibilities to apply and test findings from WP2 and WP3. Finally, the work in practice in WP4 will yield in further learnings in relation to social inclusion and upscaling.

Social inclusion and upscaling

In the Smarter Labs project, we focus in particular on issues related to social exclusion and on barriers to successful upscaling that may characterize Living Labs. Social exclusion refers to a multidimensional, multi-layered and dynamic understanding of deprivation. Local factors influence the extent to which individuals are exposed to risks and ultimately socially excluded. One of the key challenges in participatory contexts of Living Labs is to include not only technology savvy and higher educated citizens, but also those without sufficient digital and other cognitive skills. Therefore, actors involved in Living Labs should be diverse, since the development of new partnerships and collaborations allows for the introduction of new and innovative knowledge into local governance arenas. The literature on participation emphasizes that citizen involvement in planning processes increases urban democracy, but also the legitimacy of government projects. At the same time, application of participatory approaches can be constrained by expert-driven governance cultures and strategies. Participation without the sharing of power, however, is meaningless (Arnstein 1969). There are various intensities and techniques of participation that, each in their own way, have different implications for social inclusion and thus can be most appropriate for a local setting.

Upscaling, in turn, can refer to new or innovative practices (material, discursive), learned in the course of practical experiments, which shape new meso-level structures and thus ultimately transform the urban regime and trigger lasting institutional change. Much of the success of local experiments depends not only on local upscaling, but also on more transversal and translocal types of knowledge transfer. Local actors can 'jump scales' and create spaces of engagement that shift the local power balance in favor of the local experiment at the expense of vested interests.

Upscaling and social inclusion are closely intertwined: by including only a very particular set of actors in the development of a Living Lab or by focusing on very confined scales, its representativeness and potential of using its outcomes in new situations declines.
Upscaling as previously described is often constrained in practice, for various reasons. Apart from *lack of representativeness* and *expert-driven governance cultures* (mentioned above), other potential factors related to the organization of the experiment are *limited learning*, *poor timing*, and a *wait-and-see attitude*. Also, urban actors may simply disagree about pros and cons of the results of the experiment, often rooted in a conflict of interests. Finally, some urban issues can consist of such a complex interconnection of social (i.e. financial, legal, economical, behavioral etc.) and technical (infrastructural etc.) elements, so firmly integrated and embedded in an 'urban assemblage' that changing one element meets with the resistance of the whole assemblage.

Methodology
In the following chapters, this document presents the outcomes of a retrospective analysis of urban governance in the partner cities of the SmarterLabs project. The objective of the joint retrospective analysis is to evaluate a number of past innovation projects in each city to assess their contribution to institutional change (either innovation in *mobility practices* or innovation in *urban governance and planning* approaches). We will identify particular issues/barriers in the dynamics of upscaling and the risk of social exclusion of certain groups in the context of local governance. Therefore, we chose eight cases in the cities of Bellinzona, Brussels, Graz and Maastricht taking into account the following **selection criteria**:

- Geographical proximity to Living Lab experiment in WP4 (inside same city)
- Focus on urban transformations inducing high impact on the mobility system
- Significant presence/absence of a participatory approach
- Potential to learn about issues/barriers in the dynamics of upscaling (in terms of novel practices that become new structures; see definition in *Report on literature review*, Chapter 3) and the risk of social exclusion of certain groups
- Comparison of cases with positive and problematic/missing upscaling experiences
- Explicit use of knowledge as a solution for urban problems (e.g. through smart technology/ICT) (optional)

The presented cases (see Chapters 2-5) are rather diverse and offer insights into various issues. They include bike and mobility initiatives (Bellinzona), measuring of air quality (Brussels), redesigning of streets and squares (Graz), introduction of electric busses and construction of Park&Ride facilities (Maastricht).
Each academic project partner applied a similar strategy to evaluate their cities' past practices by investigating a set of critical issues (guiding questions). To guarantee a coherent research approach throughout the different work packages in the SmarterLabs project the **guiding questions** cover the same elements as those used for analyzing the Living Lab experiment in WP4:

- **Overcoming resistance to innovation and innovation achieved:** What did the innovation in mobility practices or urban governance, planning and development consist of? What was the

(potential) upscaling process envisaged (i.e. shaping which new meso-level structures)? What were barriers to upscaling? Did the project leadership anticipate upscaling of the innovation and how? Were there any local actors that established collaboration with actors at a higher (geographical) scale level, to be better empowered against vested interests? Were there any behavioral change tools applied that impacted on the relative in- or exclusion of citizens? Did the project treat behavioral change as more structural, changing daily practices? Did the project lead to worsening of conditions outside the project boundary?

- **Lessons learned**: What lessons about urban governance and planning were learned through the project? What role did the project leadership play in obtaining and disseminating lessons? Did the project leadership learn important lessons about its own functioning? Which new knowledge was generated? How was the project/process evaluated and monitored?
- **Co-design:** To what extent was the process based on co-design approaches? How was the relation between top-down and bottom-up processes? Were there any participation tools applied that impacted on the relative in- or exclusion of citizens? What problems occurred and how were these overcome? Did the participation increase the legitimacy of the project?
- **Openness, reflexivity and public value creation:** How were key actors selected, mobilized and included in the project? Were relevant actors represented in the project who would be needed for upscaling the project later on? Were there any measures to avoid inequalities and include all kinds of social groups (e.g. gender, class, race, age, income)? Did the project treat knowledge only in a technocratic sense (ignoring disagreement on values) or did it highlight/acknowledge/embrace plurality? How was the public interest secured? What can we conclude on the risk of exclusion, the way it was anticipated and the effect of the latter?

2. Bellinzona

2.1. Governance of urban processes in Switzerland

A three-level system

Switzerland is a federal state: state power is shared between the Federal government, the Cantons and the Municipalities. In such a three-level government structure, the highest level is occupied by the Confederation. According to the Constitution, its tasks and responsibilities include Switzerland's relations with the outside world, defense, the national road network, environmental protection and nuclear energy. At the second level stand the Cantons, with equal status and rights. Each Canton has its own constitution, parliament, government and courts. Each Canton determines itself how to share responsibilities with the Municipalities. Usually, responsibilities of the Municipalities include local planning and management, running the schools and social welfare.

Spatial planning, which is crucial for the development of the built environment and the management of the related mobility needs and environmental impacts, is mainly performed by Cantons and Municipalities: the Confederation just develops general framework principles and guidelines, giving the Cantons the responsibility to implement and apply them. Generally, the Cantons then delegate them at the municipal level. Therefore, the limited legislative responsibility of the Confederation leads to a variety of broad policy guidelines, spatial planning concepts and instruments, which leaves Cantons the possibility to adapt them to their specific regional context. Such an approach allows to explicitly take into account different spatial, socio-economic and cultural characteristics (Muggli 2012), though it might produce a critical fragmentation between Cantons.

The policy of urban agglomerations

Despite the different attribution of competences between the above government levels, however, they need to strictly collaborate among each other. In fact, although spatial planning is a competence of the Cantons, the Confederation has competences on transport infrastructures planning (roads and public transport systems) and environmental protection, two elements which significantly affect land use planning, and vice-versa (Muggli 2012). In order to favor multi-level collaboration, since the early 2000s the Confederation developed a new set of policy measures aimed at promoting planning of the built environment at the "urban agglomeration" level – where the "urban agglomeration" corresponds to an intermediate level between the Canton and the Municipalities. Adopting an over-municipal approach, developing larger scale analyses and seeking for effective solutions also beyond municipal boundaries is in fact increasingly acknowledged as the only way to successfully tackle mobility-related issues.

With the introduction of a more regional, urban agglomeration policy, the Confederation also provides new funding opportunities for transport-related infrastructures. Here, conditions for accessing such funds are that regional agglomeration programs present an integrated, multi-sectoral approach to spatial development, taking into account settlement, environment and mobility needs, as well as ensure citizens involvement during the planning process.

To develop them, new institutional bodies called "Regional Commissions for Transport" have been created. Such commissions include a representative of each municipality of the agglomeration and are usually supported by scientific and technical external advisors.

Citizen involvement and participation

The Swiss system is often referred to as a direct democracy, that is a form of democracy in which people directly decide policy initiatives – usually, by voting them. Indeed, the correct definition would be "semi-direct democracy", that is a representative democracy significantly including direct democracy tools (Eschet-Schwarz 1989; Kaufmann 2007). In fact, representative democracy processes are strengthened by the possibility for citizens to advance proposals for laws or policy measures (launch of a "popular initiative") or to oppose already taken decisions (activation of a "referendum"). Elections of representatives take place every four years, though on average Swiss citizens are invited to vote four times a year, spanning over very different domains: from the local approval of funding for new infrastructures (e.g. schools, transport, museums) or services (e.g. introducing a cafeteria service in schools or activating new bus routes) to foreign policy and international treaties. Both the "initiative" and the "referendum" tools are very frequently used at all government levels, including the Municipal one (Ladner 2002).

There's a debate whether leaving common citizens final policy and legislation decisions always leads to right and fair solutions (Trechsel and Sciarini 1998), especially considering votes are necessarily simplified as "yes-or-no" alternatives (Dalton et al. 2001). Also, very frequently calling citizens to vote might stimulate citizens' disaffection, as the average turnout rates suggest: they are in fact pretty low, around 40 % (Altman 2013; Blais 2014). Finally, there are risks of unbalance in access to resources (especially, money) to campaign in favor of a specific choice, which might strongly affect poll outcome (Parkinson 2011).

In general, however, Swiss citizens tend to be very proud of their direct democracy processes. Due to the longstanding tradition of such institutional processes, participatory decision-making held outside "initiatives" and "referendum" is not widespread in Switzerland. Strategic plans, programs and policy-making activities are however usually supported by a consultation process, involving the relevant stakeholders and, in limited cases, also the general public. Nevertheless, such consultation activities usually take place at an advanced stage, when all relevant elements have been designed, and possible alternative options have already been rejected, so that stakeholders are mainly allowed to either accept or refuse nearly final proposals, with no room for radical changes.

Peculiarities of today's Bellinzona

Bellinzona lies in the above governance framework. The City hosts the Canton Ticino government and parliament and it is also part of the "Bellinzonese" urban agglomeration (Figure 1). As a further complexity in such a multi-level governance structure, since the last five years the whole Bellinzonese area has been undergoing a deep restructuring of the local institutions themselves, with a formal administrative aggregation between thirteen municipalities and the creation of a "New City of Bellinzona".

In 2012, indeed, Bellinzona and other sixteen neighboring towns elaborated a common plan for their reorganization, in the form of aggregation. The majority of them, in fact, were small municipalities, which were no longer able to face the growing needs of the population, and tended to rely on cantonal institutions, instead of providing services by themselves, as the Swiss three levels of government would have required (Fenazzi 2017). Going beyond pre-existing jurisdiction borders would have also allowed to advance more effective wider-area services and land use plans, overcoming the barriers associated

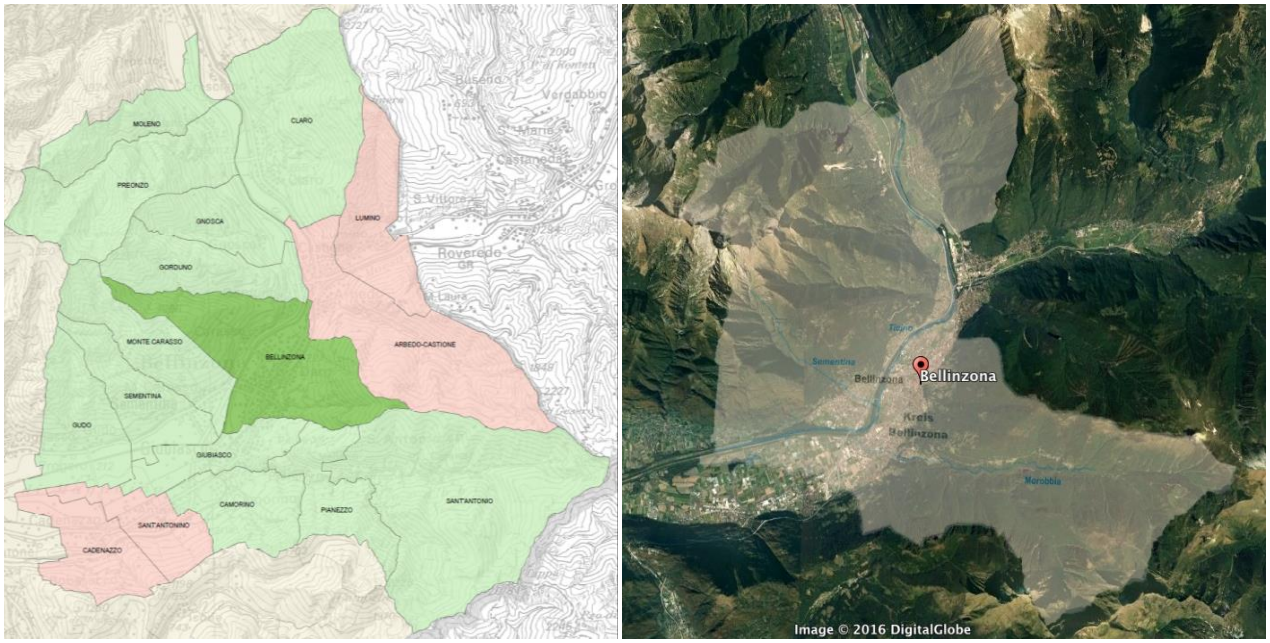


Figure 1: The area of the „Bellinzona agglomeration" (agglomerato del Bellinzonese). The map on the left shows municipal borders: the „Old Bellinzona" municipality is shown in dark green, while the municipalities which just aggregated into the „New Bellinzona" are shown in light green. Pink represents the municipalities which rejected aggregation. The map on the right shows the spatial distribution of settlements in the valley floor: a continuum of (low density) urbanized areas.

to past parochial divisions. Settlements are in fact an urban continuum, with a few focal points (a couple of city centers, besides Bellinzona), the rest mainly being low density suburban areas.

The proposal of aggregation was widely discussed at the local level, and local referendum were held in 2015 in each of the involved municipalities. Even though such referendum had a purely advisory role, their results were kept in high consideration by the municipal decision-makers: in thirteen of the involved municipalities, including Bellinzona, citizens voted in favor of the aggregation. In four municipalities, instead, citizens opposed the aggregation project and therefore their political authorities opted for withdrawing from the aggregation. Citizens of such municipalities, mainly located at the borders of the aggregation area, especially feared central communities would have gained all the benefits of the aggregation, to the detriment of the outskirts. Exactly because such municipalities were located at the borders of the whole area, however, their decision to withdraw did not prevent progress of the whole aggregation process: official formalization of the "New Bellinzona" municipality, covering the territory of the thirteen former ones (see Figure 1) took place in early 2017, with the election of the new Municipality and the City Council.

Despite the creation the "New Bellinzona" municipality, complexity of the decision making processes for mobility issues was only simplified, not totally solved. In fact, the "Bellinzonese agglomeration" (the area for which the Confederation incentivizes development of "agglomeration programs"), is still made by a plurality of institutions, still represented in the "Bellinzonese Regional Commission for Transport": the "New Bellinzona" and the other four municipalities which rejected aggregation. Therefore, positively concluding decision-making processes at the agglomeration level still requires to reach agreements between different, sometimes conflicting, local institutions.

2.2. Selection of case studies

The first case study selected for the retrospective analysis in Bellinzona focuses on the process behind the introduction of a regional bike-sharing scheme, which would have promoted both technological innovation and individual change of mobility behavior. So far, the bike-sharing service has not been implemented yet, being instead replaced by long-term rentals of reconditioned bicycles. Even though this latter initiative generated a project of social cohesion and awareness-building around soft mobility, rather than implementing a traffic management solution, the long-term rental was successfully implemented and also generated other related initiatives: it can therefore be regarded as an example of successful amplification, even though it has not yet contributed to an explicit upscaling in terms of bicycle usage and capacity in the City of Bellinzona. The second case study refers to a successful example of tackling individual mobility habits by adopting an inclusive and participatory approach, open to interaction and collaboration with the relevant stakeholders: the process of elaboration and implementation of action plans to favor sustainability and road safety on the way from home to school for primary education children. Success of the approach increases the prospect of an easy upscaling of the plans and diffusion to other contexts in the near future. On the contrary, the third case study shows a governance failure, due to the lack of open-mindedness and desire to guarantee inclusive decision-making processes. Such a case study is not strictly related to the field of mobility (it refers to land use), however it teaches us a lot about typical urban governance approaches in the City of Bellinzona.
The retrospective analysis is based on:

- official documentations produced by the involved institutions;
- press material appeared in both in local newspapers and local online news channels;
- interviews with the civil servants of the City of Bellinzona;
- direct experience and involvement as external advisor to the City of Bellinzona (only for the third case study).

2.3. Case 1: A regional bike-sharing service and the “Ricicletta” bicycles initiative

Like all conurbations, Bellinzona typically presents increased traffic problems due to urban sprawl and consequent intensive (and mainly car-based) commuter travel. Solutions to these problems have been initially elaborated within the context of the Bellinzona Regional Transport Plan (*Piano dei trasporti del Bellinzonese,* PTB) first, then transmuted into the Bellinzona conurbation program (*Programma di agglomerato del Bellinzonese,* PAB). Such conurbation programs were introduced in the late 2000s by the Swiss Confederation to fund transport infrastructures (up to 50 % of the investment costs), provided that they are based on integrated transport and land use assessments at the conurbation level and are coherent with transport land planning strategies at the cantonal level. Such funds are made available periodically over time. The municipalities around Bellinzona (overall 17 municipalities) managed to develop a conurbation program for the second wave of funding (PAB2, 2011) and have just developed an updated version (PAB3, 2016), revising the previous one and integrating a new set of measures.
Among the measures developed by PAB2 to promote slow mobility (i.e. walking and cycling), we focus on the project for a regional bike-sharing system. Classified as a high priority measure to be realized between 2015 and 2018, the new bike-sharing system would have at first involved four municipalities

(Bellinzona, Giubiasco, Sant'Antonino and Cadenazzo), envisioning enlargement to other areas in case of success. Investment costs for the realization of the infrastructure were estimated in 260,000 CHF, 40 % of which were asked to the Swiss Confederation, the rest being paid by the four municipalities involved. In spite of the classification as high priority intervention, however, the bike-sharing system has not been realized yet. After analysis of PAB2, the Swiss Confederation refused funding it, classifying it as a local measure, however asking municipalities to keep it in PAB2 and to fund it by themselves. The result was that it disappeared from the updated PAB3 document, where it is mentioned only in a final table as "suspended project, after an in-depth analysis on its costs and benefits".

Realization of a regional bike-sharing service was therefore frozen, with no indication regarding how and when discussion about it would restart. In such a framework, the City of Bellinzona decided to independently activate a smaller-scale measure to promote bicycle use: In Spring 2016 they launched the "Ricicletta" project (a wordplay between "bicycle" and "recycle"), offering free long term bicycle rental to all the interested citizens. The City recovered twenty-five bicycles from old, no longer used ones thanks to an employment program in collaboration with the association of Swiss Labor Assistance (Soccorso Operaio Svizzero – Ticino SOS-TI). Citizens were invited to borrow these bikes for an entire year for free, provided that they gave the City of Bellinzona some data about their mobility patterns. Of the twenty-five bicycles available, twenty were soon rented by citizens. The major success of this project, however, lies in the launch of a follow-up project, proposed by SOS-TI and supported by the city of Bellinzona itself: SOS-TI launched the "Ri-pedala" (something like "Re-ride") pilot project for short term rental of bicycles from a restaurant they manage, located just in front of the Bellinzona railway station. They recovered a number of other *riciclettas*, offering them to very popular prices for a few hours, a day or a whole week, and involved refugees and disadvantaged persons to manage and run the service. The offer was mainly targeting tourists, who could arrive in Bellinzona by train and then move by bicycle across the city and the surrounding areas. The pilot project had a four months duration, from September to December 2016. The pilot project has just been extended for a few months, until Summer 2017. After that period, SOS-TI and the City of Bellinzona will assess whether to reactivate it and offer it on a permanent basis.

Figure 2: The "Ricicletta" flyer developed by the City of Bellinzona (left) and the "Ri-pedala" flyer developed by SOS-Ticino (right).

Figure 3: The City of Bellinzona has recovered twenty-five bicycles from old, no longer used ones thanks to an employment program in collaboration with the association of Swiss Labor Assistance (Soccorso Operaio Svizzero – Ticino SOS-TI).

- **Overcoming resistance to innovation and innovation achieved**

This case study allows us to analyze two processes at the same time: the failure of the regional bike-sharing service and the success of the Ricicletta bicycles.

Regarding bike-sharing, we distinguish two novel practices: the practice of bike-sharing in the field of mobility, with an important infrastructural/technological element, and a general governance practice, related to the collaboration among different municipalities in a mobility sharing system. Municipalities involved in PAB2 had in fact at first opted for a traditional bike-sharing scheme, with fixed pick-up and delivery stations, even though however more innovative schemes are nowadays already available. For example, free-floating bike-sharing schemes offer more flexibility in cities, since bicycles can be freely returned and picked up in any place within a certain area, everything being based on a smartphone app, which allows real-time identification of the bicycle position. Discussion about such technological options was not even contemplated at the time of the elaboration of PAB2, probably because it was thought easier, and less risky, replicating the same traditional bike-sharing scheme already used in other areas of the Canton Ticino. This attitude somehow reflects a low willingness by the project leadership to acknowledge innovation in this field, as well as no consideration on possible future upscaling barriers linked to the choices made, let alone the explicit contemplation of citizens' and travelers' views, needs and expectations in this regard.

Innovation regarding governance refers instead to a change in institutional practices requested to activate and manage the regional bike-sharing service. In fact, the lack of federal funds by PAB2 implied that single municipalities had to pay for both the investment and management costs (maintenance of the bicycles and of the pick-up stations and daily re-balance of the position of the bicycles among the stations). Without a top-down coordination, municipalities would have realized different bike-sharing services, each one on its own district, instead of creating a single, integrated service. This would have been highly inefficient both from the operational and the economical point of view, since it would have created diseconomies of scale. For this reason, the project was frozen, waiting for the future supposed "Greater Bellinzona", resulting from the aggregation of thirteen neighboring municipalities.

Real reasons behind the abandon of the regional bike-sharing project were however likely related to low political priority by political authorities (notwithstanding high priority classification in PAB2). In fact, in other occasions, successful collaborations between municipalities overcoming administrative fragmentation were activated in Canton Ticino, for example to organize police or school services.
In the second case ("Ricicletta"), innovation refers instead to the fruitful collaboration between public and private (non-profit) institutions, which also lead to an additional project: the "Ri-pedala" pilot project. The "Ri-pedala" initiative was proposed by SOS-TI and the City of Bellinzona accepted to support it with 15,000 CHF funding, in exchange with data regarding users of the *riciclettas* (when every *ricicletta* was rented and by whom, for how long, for what purpose, for what indicative route). Success in the collaboration is probably due to the fact that the project was very simple and solid, results were easy to be measured and it required a limited amount of funding. The risk in the hands of the City of Bellinzona was therefore very low. Also, social implications behind "Ri-pedala" were an additional reason for the City to support it. In any case, however, it has to be kept in mind, that the main target of the "Ri-pedala" project is to simply offer an alternative mobility mode to tourists visiting the City – as such, this initiative does not represent an explicit strategy developed by the City administration to scale up the number of kilometers run by bicycle, nor to increase the number of bicycles used in the City. On the other hand, from this point of view, even the "Ricicletta" project itself had quite low ambitions, since it only aimed at encouraging the twenty-five *ricicletta* renters to go by bicycle more frequently, and, notwithstanding the success of the first year's rentals, did not envision an increase in the *ricicletta* fleet.

- **Lessons learned**

The failure of the PAB2 bike-sharing measure shows the difficulty of practical collaboration between municipal institutions: though apparently they share goals and actions to achieve them, when it comes to practical activities, administrative barriers are still high. Since Spring 2017, though, the aggregation of thirteen municipalities around Bellinzona into one single conurbation has formally taken place. It is hoped that this new administrative arrangement will provide the right institutional frame for a more coherent regional planning and management of infrastructural needs, especially in terms of transport and mobility.
The "Ricicletta" project was assessed very positively by the project leadership as an awareness-building tool, since it produced visibility to bicycles and was a measure to promote its diffusion at the urban level, under a negligible cost. The regeneration of used bicycles to produce *riciclettas* overall only costed 2,000 CHF – which was possible since SOS-TI employs personnel whose salary is mainly already paid by cantonal unemployment insurances. However, the "Ricicletta" direct effects on traffic reduction and individual mobility behavior change are negligible as well and there was no explicit strategy to further shape a growth of bicycle kilometers driven or modal share in the future. This rather frail stance taken by the administration in regards to upscaling bicycle use in the City of Bellinzona somehow reflects a rather weak political support dedicated explicitly to the goal of promoting slow mobility practices in Bellinzona. Slow mobility is not officially considered a viable alternative to the prevention of traffic congestion and decrease of private car use – a role that has been still delegated mainly to improving public transport services and park & ride infrastructures (as reflected in the measures contained in PAB2 and PAB3). Even "Ri-pedala" was not expected to produce significant effects on urban traffic, since it only targets tourists, who are not among the main drivers for traffic in

that area. Surely, these two initiatives cannot be compared with the impact a regional bike-sharing scheme would have had on traffic management: their main characteristic is probably that of generating social responsibility and awareness-building around mobility issues, rather than effectively curbing down car traffic.

Nevertheless, the City administration has recently reconfirmed its support to both the "Ricicletta" and "Ri-pedala" initiatives, the latter being re-proposed until mid-July 2017, with an additional 8,000 CHF funding by the City, in order to test it for a more effective impact during the Spring season (since "Ri-pedala" bicycles were mainly targeting tourists, Autumn months are not an ideal period to test the effectiveness of the commercial offer). One interesting aspect that has emerged from the previous experience is the fact that the hiring of the "Ri-pedala" bicycles was more successful whenever the vehicle itself was marked with Bellinzona's City logo. Consequently, the renewed "Ri-pedala" initiative will now (i) produce a series of additional new *riciclettas*, all bearing the City logo, as well as (ii) enlarge the "Ri-pedala" bicycle fleet with at least part of the existing City-marked "Ri-ciclette" that are being returned by citizens, (iii) include the participation of the main local energy utility (AMB) as a sponsor for future activities. The financial support that has been provided to the "Ri-pedala" project by the City administration in these two pilot phases is substantial (a total of 23,000 CHF) and justified by the fact that the initiative is contemplated as a forerunner project for the collection of data and useful inputs to the formulation of a future bike-sharing program in the City of Bellinzona. As such, even though the "Ricicletta" and "Ri-pedala" projects cannot yet be regarded as an explicit example of successful upscaling, they nevertheless both represent a positive precursor sign for the creation of a future functional and participative bike-sharing system in Bellinzona.

- **Co-design**

The process for the elaboration of PAB2, which included the regional bike-sharing measure, was managed by a group of sector professionals, supported by a commission of six representatives of the 17 municipalities involved and some representatives of cantonal sectors, and included periodical meetings with representatives of all the municipalities. Its elaboration followed therefore a traditional top-down, expert-led approach, where little space is dedicated to bottom-up creation of vision and ideas. Each municipality mainly seized the occasion to include projects they had already envisioned, with the aim of getting funding to cover their realization. Probably, if a more inclusive process had been activated to support identification and design of each PAB2 measure, such as, for example, interviewing travelers and citizens about their experiences, needs and expectations (e.g. station-based or free-floating bicycles), critical aspects behind the project of a regional bike-sharing service would have soon emerged, thus leaving room for the identification of alternative ways to guarantee cost-effective management.

Even the "Ricicletta" and "Ri-pedala" projects themselves, still represent more of a top-down approach, since they started from the initiative of a civil servant of the City of Bellinzona, who had the idea and subsequently activated contacts with an external partner, SOS-TI, and managed to get municipal funding. Nevertheless, this public-NGO partnership has proven fruitful, since it was SOS-TI who later contacted the same civil servant to get the financial support for the "Ri-pedala" activity. So, both projects were co-designed by the two institutions and this is a further ingredient of their success.

- **Openness, reflexivity and public value creation**

As indicated above, the only actors involved in the decision-making process behind PAB2 were the commission of experts and representatives of the 17 municipalities involved. A final consultation targeting the population and local stakeholders was organized only at the very end of the process, just before submission to the Swiss confederation: the final PAB2 program was presented to the population and thirty days were allowed to present any proposal, observation or request for clarification. Consultation opened on September, 17 2011 and closed on October, 17 2011. Considering PAB2 was submitted to the Swiss Confederation on November, 9 2011, it appears the consultation did not influence any of the decisions already taken. Therefore, the process remained rather sealed and little reflexive in its approach of securing public interest, avoiding inequalities and anticipating and/or tackling possible risks of exclusion.

The "Ricicletta" and "Ri-pedala" projects, instead, were totally developed by the city civil servant, without discussion with other actors apart for the SOS-TI stakeholder. Considering their limited impact both on traffic and on the city budget, it is understandable that no specific participatory project was launched; however, including citizens or other actors in a wider participatory process regarding the future of mobility would have probably guaranteed more success to the "Ri-pedala" project and ensured more effective upscaling conditions. At present in fact, there's the risk that this initiative might turn into an isolated case, with no long term prospects.

Nevertheless, the "Ricicletta" and "Ri-pedala" initiatives might be considered more as activities of public value creation, rather than of traffic management. The "Ricicletta" and "Ri-pedala" projects indicate in fact an innovative local strategy of community-building and networking promoting social responsibility in terms of both (re-)integrating unemployed/refugees people in the labor market and encouraging at the same time a more ecological, soft mobility in the City. As such, the emerging partnership development between the City department and the SOS-TI non-profit organization is surely a positive and open outcome from the point of view of social inclusion.

2.4. Case 2: Mobility plans for schools

In 2011 the City of Bellinzona adopted a participatory approach to school mobility planning: it launched the "Mobility plans for schools (PMS)" within the so-called "Better on foot" school project (http://www.meglioapiedi.ch/) with the aim of stimulating a more sustainable mobility behavior within the school community (addressing pupils, parents, teachers, school staff) as a mean to promote children's health and road safety, as well as to reduce traffic congestion and pollution.

- **Overcoming resistance to innovation and innovation achieved**

The innovative aspect of this initiative is that PMS provide an inventory of existing home to school modal patterns and elaborate possible alternative solutions on the basis of bottom-up inputs received from the school community in collaboration with a professional mobility expert working closely with the public administration. The PMS project has been extended to cover the compulsory school system of the City of Bellinzona, subdivided into 4 city districts. In total, 6 PMS have been elaborated since 2011, involving 12 schools (6 pre-schools, 6 primary schools, 2 middle schools). Up to now, the project has not been expanded to secondary school levels, such as vocational or high schools. This is mainly due to the fact that these kind of schools are not part of the municipality's policy area. Furthermore, mobility patterns of students here change significantly and include a much wider travel area, with

pupils travelling in many cases from all over the Canton. As such, any intervention to amplify the initiative would, in this case, necessarily need an integrated planning and management approach harmonizing two different administrative levels (municipal and cantonal). In itself, the PMS is a voluntary measure, not linked to any formal planning processes of the City. Consequently, it does neither rely on a specific budget for the implementation of the proposed action plan, nor is it a binding tool. The recommendations emerging from the PMS and possible interventions are financed by resources derived from other official urban planning tools available to the City, such as the overarching Bellinzona conurbation programs (PAB) or the municipal traffic management plan.

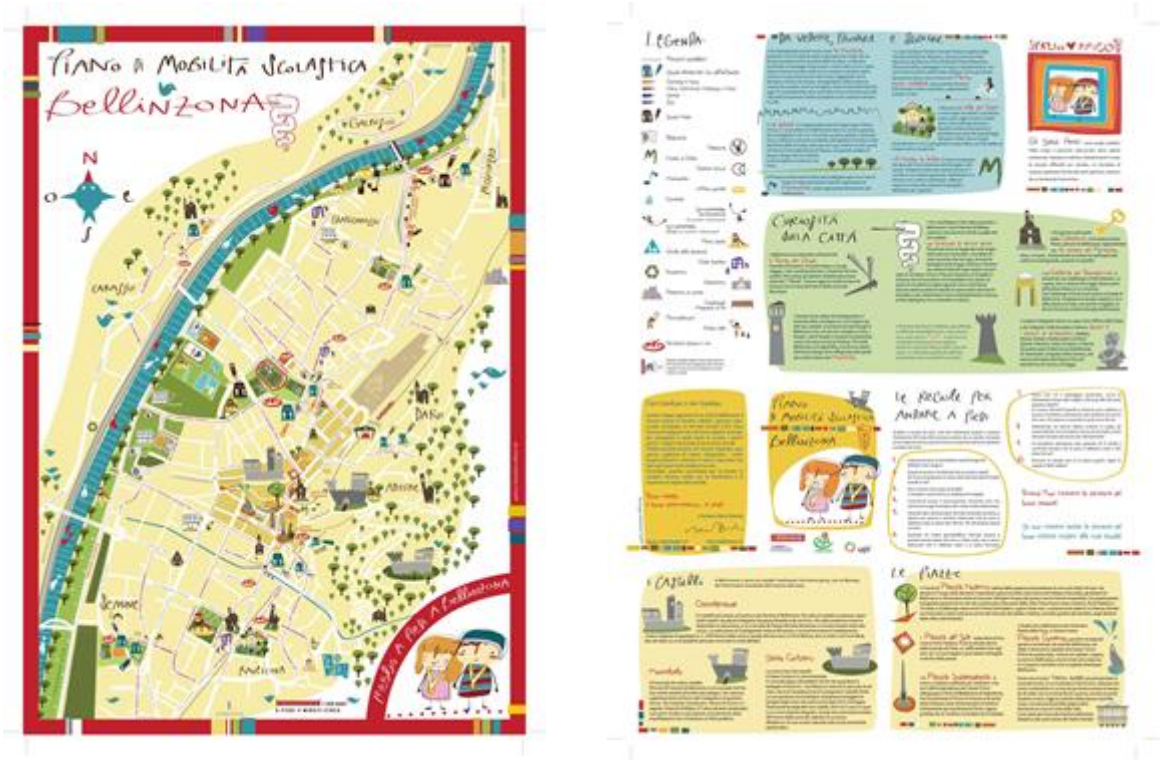


Figure 4: Excerpt from the material developed by PMS addressing pupils and parents

Interestingly, since Spring 2017 the City of Bellinzona is currently experiencing an important transition from a former single municipality to an aggregation of 13 municipalities. Although the project leadership has not yet explicitly anticipated additional expanding of the PMS, the new administrative organization of the city will most probably oblige Bellinzona to address this issue, if it wishes to maintain and extend this innovation process to its wider community. However, in the light of the future, possibly more explicit expansion of PMS towards an essential governance practice of the City, it might become necessary to include PMS into the framework of mandatory local plans and would probably need a process of formalizing PMS as an official participatory mobility planning tool of the City. In this context, however, political will and priority-setting in regards to a topic that is often regarded of low concern, such as participatory school mobility, might turn into a potential constraint towards PMS's upscaling process.

- **Lessons learned**

According to the project leadership, the most important achievement of the PMS is to have created a virtuous circle of good practice, mainly fueled by citizens (sensitive parents) that see their fears of

traffic and safety and more specific requests taken into account by the local administration. Furthermore, the PMS have triggered new requests from the local community, such as the organization of cycling agility courses for children, the purchase of a bicycle pump-track by the City and the promotion of a "bicycle bus" initiative.

Considering that children are often ignored when designing public spaces, the fact of producing ideas concerning mobility habits and road safety together with the involved key actors, ensured the City department of the creation of new knowledge in regards to the integration of children's specificities into school mobility planning. For instance, the PMS revealed that the dynamics of dropping off children at school and that of picking them up after school involves two completely different behavioral schemes from parents – aspects that have been progressively taken into account in the logistic organization of respective temporary parking areas. As for the evaluation of the project itself, unfortunately, there is no in-depth monitoring system currently in place to evaluate the project by the City department. Main reasons for this are (i) the limited time resources available to the local administration to undergo such targeted analysis, and (ii) the continuous renewal of the school community and change of context having to be monitored.

- **Co-design**

The school project "Better on foot" and the respective PMS act along two lines. On the one hand, it has a top-down approach to promote the collaboration between the different sectors of health, transport and education, as to obtain the necessary local organizational and infrastructural support to promote slow mobility measures at school. At the same time, a bottom-up approach is applied, as to actively involve families, children and school staff in the set-up of new initiatives addressing slow mobility. While the set-up of the PMS action plans and recommendations worked out well in terms of an inclusive, participatory process involving the school community, the most involved actors were mainly parents and, indirectly, their children. At school level, the PMS framework expects that the new awareness created is disseminated across the school and is integrated into the school teaching practices through communication campaigns and promotional material. In the case of Bellinzona, however, this step turned out to be a critical one: integration into the educational programs of the school, in fact, strongly depends on the sensitivity of the single teacher involved, which cannot be taken for granted. Up to now, the City department has tried to overcome this problem by joining other initiatives, such as road safety education programs run by the local police, to combine common goals. However, further possible measures should be considered.

- **Openness, reflexivity and public value creation**

Pupils, parents, teachers and school staff were all involved alike in identifying problems and opportunities, as well as in analyzing possible solutions and producing ideas to improve road safety from home to school. A formal working group, steered by a professional mobility expert, produced the analysis, results, action plan and recommendations to the City department. As such, the PMS surely takes into account the individuals affected by the policy solutions envisaged to promote slow mobility practices at school. The project remains open and reflexive, as it ensures a meeting between key actors (mainly the parents' assembly) and the City department at the beginning of each school year, with the aim of openly discussing the PMS action plan and recommendations and addressing the work that has been done or is in progress, as well as future prospects. However, in the long term, one typical problem

remains that of keeping the attention of key actors alive. Those actors, especially parents, that are already sensitive to the topic, attend the meetings and actively participate. For many parents and school staff, however, it remains an issue of low concern. As such, additional initiatives to raise public interest may be necessary and pivotal for triggering a larger cultural shift towards taking into account both children's needs and, in general, pedestrians' needs into street design and town planning. However, currently the PMS approach is limited to school routes only and has not been extended to other policy domains of the City.

In summary, we find some evidence for upscaling of the practice of children and parents going on bicycle or foot to school. Although direct numbers of trips (or modal shares) are not available, we find that new requests from the local community, such as the organization of cycling agility courses for children, the purchase of a bicycle pump-track by the City and the promotion of a "bicycle bus" initiative, have been triggered. In terms of governance practices, the project shows a novel way to actively involve families, children and school staff in the set-up of new initiatives addressing slow mobility.

2.5. Case 3: Transformation of the Pratocarasso area

The third case study related to the City of Bellinzona refers to the transformation of the Pratocarasso region, a green area of 200,000 m^2 mainly employed for agricultural purposes. Since the first Land Use Plan of the City of Bellinzona, developed in 1967 and finally approved in the Eighties, the area was zoned as a residential settlement, subject to the development of a detailed land planning act. Thanks to an initial project developed in 2003 by some students of the Mendrisio Architecture academy (a well-known university faculty in Switzerland), later taken over by one of them, now professional architect, in collaboration with the City planning office, a detailed development plan was finally approved by the Municipality of Bellinzona in 2006, followed by the approval by the City Council in 2010. The entire compartment was conceived as a low density, speed limit zone, thus utilized by vehicles, pedestrians and bicycles alike. A green public leisure area was also envisioned. Overall, approximately 100,000 m^2 would have turned into residential zoning, the rest being left to roads and farming areas, in equal parts. The City motivated the plan as an occasion to provide Bellinzona with a substantial residential zone, while safeguarding a wise utilization of resources and in respect of present local development activities.

However, in March 2010 the civic party "Bellinzona vivibile" ("Liveable Bellinzona") and the Green party defined the project as "useless and not of priority to the city". They collected enough signatures to launch a municipal referendum in regards to the provision taken by the Municipality and Council of Bellinzona. In June 2010 around one third of the citizens with right to vote participated to the referendum and 65 % of them rejected the project. Positions of those who voted against the project were quite diverse: some complained about supposed low quality of the residential transformation proposed (for some, building densification was excessive, for others it was too low and the project would have only contributed to urban sprawl), others criticized the loss of the last wide green area in the city, others finally deplored that such a project had strategic importance for the city, and, whatever the decision, it should have required wider discussion and decision by the entire population, instead of limiting it to Municipality and City council.

Figure 5: Pictures of the Pratocarassso area: a large agricultural land at the outskirts of Bellinzona

- **Overcoming resistance to innovation and innovation achieved**

After so many years of discussions around the Pratocarasso area, the City was discouraged by the outcome of the referendum and asked for help to external experts of the local University of Applied Sciences (SUPSI). Believing that the proposed transformation of the area was rejected since it was not "sustainable" enough, the City asked such experts to develop a masterplan envisioning the transformation of the area in a "sustainable residential neighborhood". SUPSI suggested however not to focus on specific contents of the transformation, and to target instead the governance process behind the transformation itself. In particular, SUPSI suggested to go to the root of the problem, proposing the elaboration of a "*Strategic sustainability plan*" for the City of Bellinzona, as a mean to help decision-makers guide development and overcome the conflict arisen with and between citizens and to find a constructive solution. The plan was meant to assist the City of Bellinzona in taking more inclusive decisions, orienting overall local development policies towards more sustainable choices and encouraging local level participation. Somehow, the Pratocarasso case study would thus serve also as a mean to upscale a socially more inclusive and cross-cutting governance approach to all policy areas of the local administration. In particular, the specific aim was to:

- promote the integration of sustainability criteria in future land use planning;
- facilitate citizen participation in the City's decision-making processes;
- improve the communication channel towards citizens, by encouraging more transparency and a better tracking of local decision-making processes.

In early 2011 the City of Bellinzona rejected the Strategic Sustainability plan proposal and asked for a more focused approach, just dealing with possible development scenarios of the Pratocarasso area. In such a framework, SUPSI suggested to:

- identify, ex-novo, the possible future vocation of the Pratocarasso area and surroundings by means of a participatory process;
- and explicitly assess alternatives for the transformation of the area, according to a multi-criteria group decision-making process.

Vocation, alternatives and decision-making criteria should have been identified in a bottom-up fashion, with the aim of explicitly considering possible conflicting elements among the population and the key stakeholders. Also, the "no-transformation" alternative should have been explicitly considered and compared to the other proposed alternatives, based on their expected effects – that is: the process

should have been open to accept any possible outcome, even the revision of the residential zoning of the Land Use Plan, if necessary.

In the meanwhile, municipal elections took place and the new SUPSI proposal was discussed in late 2011, under a newly elected Municipality and City Council (the same in charge until today). Though approved by the new Municipality, the new City Council rejected it, for the following main reasons:

- the left wing believed any decision about the (residential) transformation of the area should have been framed within larger scale, overarching land use plans. Thus, they preferred to suspend any decision about the area and to wait for top-down decisions at the canton or district level;
- the right wing stated not to be receptive to any solutions that did not entail possibilities of constructing in the Pratocarasso area.

After such a decision, the launch of a participatory approach was precluded and then no further proposals were developed for the Pratocarasso area, which still remains a farming land.

Even though the participatory approach itself was not explicitly questioned, the outcome of the Pratocarasso process was quite clear: in regards to future development scenarios of the City, no extra-political interference with the decision-making processes is desirable. Indeed, this case study provides us with some important insights on a peculiarity characterizing the Canton Ticino in regards to urban governance innovations in general and closely related to a specific characteristic of the Swiss democracy, namely: easy accessibility to formal tools for direct democracy, such as the referendum at the municipal level (see Chapter 2.1). Since there is already an abundancy of occasions in place for citizens to vote and express their preferences in regards to local issues, public institutions tend to minimize in general the necessity for additionally more inclusive, participatory tools. However, this attitude prevents politicians and public institutions from acknowledging the thin line existing between top-down and bottom-up built consensus. Whether it is an excuse for not facing the more empowering potential of bottom-up approaches or not, in an open system (=urban environment), where the number of players and the number of variables are not predictable, this attitude becomes problematic in the long term if not inclusive. However, resistance to innovation was even stronger for Pratocarasso than elsewhere. In fact, it was widely acknowledged that the City was facing a deadlock situation. To overcome it, SUPSI, an institution whose value was locally widely recognized, had proposed to somehow “upscale” the level of analysis, going to the root of the problem, instead of focusing on its external outcome. SUPSI believed in fact that conflicts regarding the Pratocarasso area were due to a lack of strategic, shared vision for the whole Bellinzona region, in general, and to a lack of shared vocation for the Pratocarasso area, in detail – and not simply to the choice of the intensity of zoning. According to SUPSI, to exit the deadlock the city should have sought for new ways to stimulate citizens themselves to get engaged and face together the conflictual urban development process. Such a proposal to innovate local governance practices was however stopped by the lack of familiarity with participatory approaches, which lead institutions to fear public participation would have

- increased decision-making times, without guaranteeing achievement of a shared decision
- and at the same time loosened power and responsibility of the executive and legislative bodies governing the city.

Therefore, the new administration preferred to stick to the formal procedure of representative democracy, thus leaving the conflictual situation unresolved.

- **Lessons learned**

Unfortunately, this episode seems not to have triggered a change in the way local development projects could be conducted in the City of Bellinzona. First of all, both administrations, old and new, do not seem to have seized the importance of introducing a wider, more strategic planning of the City as to solve specific conflicts, such as the Pratocarasso case. Instead of focusing on developing overarching, long-term goals at the city-level, both administrations seem to remain trapped in a more short-sighted governance approach, reacting in a case-to-case basis. Not surprisingly the old administration opted for a case-specific solution to the Pratocarasso area, instead of trying to analyze the wider context in which the entire matter is situated. Nevertheless, while the old administration acknowledged failure of the traditional *decide-announce-defend* (DAD) approach and had opened up to starting a bottom-up participatory approach to solve the issue, the newly elected administration took a step back on local level participation, preferring no confrontation.

As a confirmation that lessons were barely learned, one may consider the list of the municipal referendum processes activated in Bellinzona after the Pratocarasso one: three other municipal referendums took place from 2011 to 2013 – and in two of them, decisions taken by the City were rejected by the population.

Table 1: List of municipal referendum processes held in Bellinzona between 2011 and 2016

Referendum against	Year	Outcome
Revision of the Land Use Act for the "Campo militare" lot	2011	The proposed realization of a new technological and scientific center in a green area was accepted by 89 % of the voters
New granite flooring in the old city ("Let's save the porphyry cobbles")	2011	The proposed replacement of the old porphyry cobbles flooring with granite flooring is rejected by 76% of the voters
Investments in the electricity company "Repartner" (based in the Swiss Canton Grisons) and less active in renewable energies than the local utility company	2014	Investments in the utility company "Repartner" are rejected by 64 % of the voters

- **Co-design**

The way this specific Pratocarasso case ended, reflects the typical policy of burying one's head in the sand, and conducting a 'wait-and-see' diplomacy by the City of Bellinzona. By rejecting the opening-up to a participatory decision-making process for the Pratocarasso district, without having ready some alternative solutions, nor prospecting the study of new outlooks for the area as a priority, implies preferring to "keep things as they are" for several more years.

In the past, the most frequent blame advanced to the Municipality of Bellinzona was one of being distant from citizens, shut off in its ivory tower, not sharing projects with the outside and not involving key stakeholders. It is this attitude that probably caused the rejection of the proposed Land Use Plan revision for the Pratocarasso district by means of a citizen referendum – a conflict started back in 2003. The old Municipality had opened to the idea of finding new ways of unblocking this conflict situation by trying to involve parties and key stakeholders in finding a common solution, according to the participatory process proposed by SUPSI. However, the newly elected Municipality somehow stopped this opening. Without questioning the validity of a participatory urban planning approach, the main political parties buried this opportunity by either postponing the question to future actions or closing

to the idea of a possible "non-development" scenario for the Pratocarasso area, potentially emerging as a result of consulting the local community.

- **Openness, reflexivity and public value creation**

Needless to say, any Land Use Plan is subject to change at any time: as land is developed and the needs of the community evolve over time, periodic updates are necessary to keep the plan current. In the present case study, the urbanization project proposed by the administration based on an initial project developed by external professionals, who closely collaborated with the planning office. As such it does not seem to have been an open, inclusive process, in which actual needs of the community were taken into account, nor did they further question the usefulness of integrating a bottom-up process to better orient future development choices.

2.6. Concluding remarks

In general, it can be said that the City of Bellinzona is in the process of activating a series of important measures to promote a more sustainable mobility and transport system. At the higher, regional level, by means of the so-called PABs, significant infrastructural investments are currently being made to strengthen especially the local and regional public transportation network with the contribution of federal funds. In this context, even though an upgrading of slow mobility facilities is contemplated as an important priority development goal of these overarching PABs, the actual development and implementation of specific measures is being relegated to the local, municipal level. As PABs are meant to provide the strategic direction to achieve regional outcomes that align with the Canton's interest in land use planning and development, they are by their very nature, a rather traditional approach to planning decision and not particularly inclusive in their generation of contents. Inevitably, innovation in urban mobility strongly depends also on local government planning. However, at this hierarchical level, often, what is missed is, above all, a new development vision, followed by a lack in courage to launch more pioneering solutions. Local administrations, in fact, are constrained with avoiding potential risks, are frequently faced with limited financial resources and are often characterized by the incapacity of overcoming conflicting interests, political priorities, overlapping of contents and procedures. The abandon of the regional bike-sharing project described in case 1 is a common example reflecting this local dilemma. Nevertheless, the "Ricicletta" and "Ri-pedala" pilot projects show that when an innovative idea and the willingness of a few local actors exists, it is still possible to accomplish some innovative mobility initiatives and create new partnerships. Nevertheless, we find it is unlikely that bicycle sharing and use will scale up majorly soon, mainly because there is no political majority to strongly support car alternatives at the expense of car mobility (constraint #5, see Table 6). Also, there were no local bicycle users involved in the development of the projects (constraint #1, see Table 6), although in terms of social impact there was a successful inclusion of unemployed and refugees. Also in case 2, upscaling of children/parents going on bicycle/foot to school is constrained by a lack of political majority to strongly support car alternatives at the expense of car mobility. There was successful inclusion of parents and teachers in developing mobility palms, although most parents were 'the already converted'. This shows that, at City Department level, there is place for the application of more inclusive governance tools as a mean to encourage the local community to engage more in slow mobility. Instead, case 3, concerning the land use development plan of the Pratocarasso area, though not directly addressing mobility issues, is an emblematic example of how local administrations are

often not yet prepared to acknowledging more inclusive governance tools, transversally, in a more strategically way to all of its policy areas. Here, the two main barriers to the upscaling of the novel governance practice are the general aversion of policymakers to interference of stakeholders with their decision-making process, and related to this, the lack of familiarity of a more co-creative approach (constraints #5, #6, see Table 6). A cross analysis of the three case studies with respect to social inclusion and upscaling (and the related capability to produce large scale changes in urban transport systems) is summarized in Table 2. It highlights that in Bellinzona attempts to public participation and upscaling fail when strategic, key urban policy-making and planning are involved. Instead, activities perceived as thematically focused and low-conflict are more successful, though they still remain in their seedbed and do not yet reach a level of institutional upscaling.

Table 2: Concluding remarks from a cross-cutting analysis of the three Bellinzona case studies

	Weak	**Strong**	**Neutral**	**Conclusions**
Social inclusion	- Conurbation plan (PAB2 and PAB3) - Strategic plan for sustainability - Regional bike-sharing service - Detailed land use planning (Pratocarasso)	- Mobility Plans for Schools	- "Ricicletta" and "Ri-pedala"	Citizen participation is precluded in strategic decision-making processes, due to a fear of facing conflicting goals
Upscaling	- Regional bike-sharing service - Detailed land use planning (Pratocarasso) - Strategic plan for sustainability - Mobility Plans for Schools (an explicit upscaling has not yet occurred, though the project has benefited a positive extension)		- Conurbation plan (PAB2 and PAB3) - "Ricicletta" and "Ri-pedala" *(depending on decisions for its permanent activation in summer 2017, it might turn into "strong")*	A first amplification of initiatives is effective only when simple, specific and thematically focused activities are at stake

3. Brussels

3.1. Governance of air quality in Belgium and Brussels[1]

This section aims to shed lights on the complex mosaic of institutions that are (directly or indirectly) competent for air quality in the Brussels Capital Region. The city's central role in the regional and national context, and the extensions of the metropolitan area well beyond the regional borders, on one hand, imply the coexistence of institutional stakeholders at different scales. The fact that 'air' lies at the intersection between existing policy domains, namely mobility, environment and health, on the other hand, results in a horizontal fragmentation of competences and jurisdictions. The existence of historical tensions among different constituencies, finally, adds an extra layer of complexity to the possibilities of cooperation among these numerous stakeholders.

Institutional framework

Belgium is a double federation of regions and communities organized on a three-level institutional framework (see Delwit and Deschouwer 2009). At the top of the structure stand the Federal State, the Linguistic Communities, i.e. the Flemish, French and German-speaking communities, and the Regions, i.e. BCR, Flanders and Wallonia. These institutions have equal legal status, and different and exclusive competences. Broadly speaking, the Federal State has competence over everything connected with the public interest, throughout the country; the Regions are competent within the respective regional boundaries for matters related to the territory (e.g. urbanism, mobility, development, environment...); and the Communities are competent within the respective linguistic areas for people-related matters (e.g. culture, education, health...). The next institutional levels consist of the provinces and of the communes, which have extensive competences in directly providing services to the inhabitants under the supervision of the Federal State, the Communities or the Regions, depending on the policy domain. (Lagasse 2012; more info also on: www.belgium.be). Different (and possibly conflicting) drivers behind the process of federalization of the country, as well as the concurrent presence of two sorts of federated units with intersecting territorial jurisdictions, have led to the presence in the country of four areas characterized by different institutional settings, namely BCR, Flanders, Wallonia, and the German speaking area within Wallonia (see Swenden and Jans 2006).

As a region, BCR is governed by a regional government, competent for territory-related matters, such as mobility and the environment. At the same time, BCR has a bilingual status, which is why person-related competences are shared by the Flemish and French Community. The two Community parliaments enact 'primary legislation' concerning services to Dutch- and French-speakers in the capital. Two language groups composed by the BCR members of parliament, moreover, can propose supplementary legislation (secondary legislation) to implement the Flemish or French Community policies within BCR (respectively the Flemish Community Commission (VGC), the French Community Commission (COCOF) and the Common Community Commission (GGC/COCON). When the consent of both groups is required, a Community Commission (GGC/COCON) is constituted (Swenden and Jans 2006). The provincial level is missing, and the competences that are otherwise of provinces, are attributed to the Region, or shared by the Flemish and French communities, depending on the subject. The regional territory, finally, is divided in 19 municipalities of extremely variegated size, socio-

[1] This section has been published as: da Schio, et al. 2017 (forthcoming)

economic and demographic profiles (for a presentation of this diversity, see Delwit and Deschouwer 2009).

Another important element which is useful to understand the functioning of the Belgian institutional framework is the role of ministerial cabinets, and their relation with decision makers and with the administration[2]. As opposed to other European countries, in particular, Belgium has a long tradition of engaging ministerial cabinets in policymaking. They are typically relatively large and include both civil servants and advisers, who are expected to be aligned with the ministers' political standing. In addition, cabinet members not only advise the minister, but also provide political direction and management to the entire ministry, and are in superior position in relation to senior civil servants within the administrative body (Brans et al. 2017). This implies that each one of the main policy domains is characterized by the concurrent presence of different bodies playing a role in the execution of governmental decision, namely the ministerial cabinet and the administration.

The Brussels Capital Region

Air quality is the subject of an intense normative activity at different institutional levels that are all relevant for the governance of air in BCR.

At the **international level**, the World Health Organization conducts regularly research to identify the health impacts of air pollution and defines regularly the limit values for key pollutants (WHO 2016). While the WHO guidelines are not legally binding, they are recognized as an important reference by researchers in the field and by policy makers. In Europe, the competence over this domain is shared between the EU and the member states, in the context of a common strategy to pursue at the same time the protection and improvement of the environment, and the protection of human health (Art 191 of the Lisbon Treaty). A key legislative reference is the EU Directive 2008/50/EC on ambient air quality and cleaner air for Europe (Ambient air quality Directive – AAQD), which "establishes air quality objectives, including ambitious, cost-effective targets for improving human health and environmental quality up to 2020, it specifies ways of assessing these and possibly taking corrective actions, and finally it provides for the public to be kept informed" (European Council 2008). In addition to that, in 2013 the European Commission has adopted the "Clean Air Policy Package", after a comprehensive review of existing EU air policy, and extensive consultations.

The Package includes a new Clean Air Program for Europe, with measures to ensure that existing targets are met in the short term and new air quality objectives for the period up to 2030, a revised National Emission Ceilings Directive, and a proposal for a new Directive to reduce pollution from medium-sized combustion installations. While the Directive 2008/50/EC merges most of existing EU legislation into a single directive, other prior legislation is still relevant in the Brussels context. This is the case of the Council Directive 96/62/EC on ambient air quality assessment and management (Air Quality Framework Directive), and the Council Directive 1999/30/EC relating to limit values for Sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air. While the validity of these two directives ended in 2010, they were the reference legislation, for instance, for the Pollution Peak Emergency Plan (see Chapter 3.3).

In **Belgium** air pollution has been framed as an environmental issue, which is an area of regional competence. Given the principle of exclusive competence, air pollution is not addressed as a public

[2] These are not to be confused with the cabinets of ministers or the council of ministers, which compose the governments. Ministerial cabinets, in some way, are an extension of each of the ministry and are located at the structural interface between politics and administration.

health issue, which is a competence of the federal government and of the linguistic communities. Regional governments play the leading role in the implementation of the EC directive and are directly responsible for measure and regulating over outdoor air quality; the federal government, in turn, has a relatively marginal role, namely the regulation over emissions from products and devices (e.g. vehicles). An evident limit of this 'regionalization' of environmental competences is that most environmental issues span beyond the regional borders and demand for a coordinated visions and management. The principle of exclusive competence mentioned above implies that inter-regional coordination, needs to be developed with ad-hoc interregional instruments and cannot be led by the Federal State. This is the case of the Belgian Interregional Environment Agency (IRCEL-CELINE, www.irceline.be), responsible to organize and disseminate the data on air quality collected by the regional telemetric networks (despite the name, CELINE thematic focus is mainly limited to air).

In **the Brussels Capital Region,** air quality is a matter of competence of the Minister responsible for Housing, Quality of Life, Environment and Energy. At the time we write (February 2017), there is a focal point for "Climate and air" within the ten people environment department of the cabinet. The BCR administrative body responsible for the air quality is 'Brussels Environment – BE' (also referred to as Fr: *Institut Bruxellois pour la Gestion de l'Environnement – IBGE;* Nl: *Brussels – Instituut voor Milieubeheer – BIM*). Notwithstanding the 'environmental' connotation that is given to air and pollution related issues, its governance and regulation are directly related to a number of other policy domains, and in particular mobility and transport, implying a de-facto role of the cabinet of the ministry of mobility and public works; as well as the regional administration for mobility among others.

Key legislative references setting the regional framework of air governance are presented hereafter. All of them make reference to improving air quality, mainly through intervention in the mobility and in the buildings sector.

- The Brussels Code for Air, Climate and Energy Management – **COBRACE** (Fr: *Code bruxellois de l'Air, du Climat et de la Maîtrise de l'Energie*), adopted by regional ordinance on May 2, 2013. It merges in a single text all legislation on the domain of air, climate and energy and introduces new measures in terms of buildings energy and environmental performance, and of public sector leadership. It also introduces the PRACE, and the main elements that this should include.
- The Regional Plan for Air, Climate and Energy – **PRACE** (Fr: *Plan Régional Air-Climat-Énergie*), adopted by regional decree on June 2, 2016. It is the BCR plan to reduce energy consumption and GHG emissions, and to improve air quality. In particular, air quality is the theme of one of the 10 priority axes of the plan. It should be noted that, while many measures proposed in the plan are likely to have an impact on air quality (e.g. improving the environmental performance of the sector or the mobility sector…), the substantive measures that directly deal with it concern monitoring and analysis, rather than concrete action.
- The Regional Plan for Sustainable Development – **PRDD** (Fr: *Plan Régional de Développement Durable*), which draft was submitted to public inquiry between January and March 2017. It is the overarching plan for regional development toward a 2025 and 2040 horizon. Air quality improvement is part of one of the regional strategies to preserve and improve the regional natural heritage, in the context of a more liveable, sustainable and attractive living environment. In particular, the plan indicates the main areas of intervention, namely the transportation and the building sector, and alludes to a series of measures that will be taken

(e.g. implement a Low Emission Zone, encourage active mobility, improve the public transport offer, favor cleaner cars).

In Brussels, possibly also because of a fragmented institutional framework and the relatively unambitious sustainability policies of the public authorities, **the civil society** has been historically very active to mobilize citizens, to bring forward the public discussion for a better city, and to propose innovative solutions. Air quality and pollution themes are not an exception to this trend: at least since 2005, and more so in the last three years, air quality has been a key priority from many different perspectives (e.g. environment, public health, mobility…). In this context, the work of the local association 'BRAL – Citizens Action Movement' is particularly relevant (BRAL is also partner to the SmarterLabs project and in the Brussels Living Lab). Following extensive consultation with its members, in 2014 BRAL decided to focus part of its work on the quality of air and started mobilizing different groups of citizens to work on participatory measurements of air quality, awareness raising, and advocacy for cleaner air. The work of these groups, today, has gone beyond BRAL's program of activities. An important example is the movement Clean Air Brussels (www.cleanairbxl.be/), which has launched a petition to ask the government more ambitious actions to reduce pollution. Unsatisfied with the response to the petition, five members of the movement, also, took BCR to court requesting it be held accountable for "the development of a plan against air pollution that is conform to European legislation". Other groups have been established in the context of expAIR and the Brussels Living Lab and are currently developing (see Chapter 3.5 for more details).

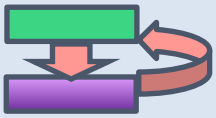
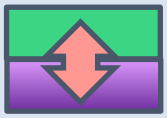
3.2. Selection of case studies

In the context of the Brussels Living Lab experiment, which focuses on the co-production of knowledge on urban air quality and of solutions to address pollution, we propose a retrospective analysis of three initiatives related to the governance of air in the Brussels Capital Region (BCR). In the introductory section, we introduced key elements of the BCR institutional framework, showing how responsibility over issues related to air quality is dispersed among different actors at different levels and with different constituencies.

In the following sections, we zoom into three case studies that illustrate different approaches to the governance of air. As opposed to other urban metabolic flows, clean air does not need distribution infrastructures, such as pipelines and aqueducts, electric grids, road and rail networks. A key component of air management, conversely, are the systems of sensors, models and maps that measure the presence in the air of specific contaminants. This information, together with a series of considerations on the level of concentration that is socially and biologically acceptable, is then used to influence the governance of other sectors and possibly prevent excessive pollution. What we know about air pollution today, how we know it, and the ways in which the atmosphere is governed, we shall see, are not inevitable parts of closed systems, but are legitimate objects of political contestation and potential transformation (e.g. see Whitehead 2009).

To illustrate the different ways knowledge is generated, interpreted and shared in the context of BCR air pollution, and how different approaches relate to different governance styles, we build on the literature on citizens' participation and on knowledge co-production (see for instance Reed 2008; Philipson and Liddon 2007), and use a typology based on how this flows among citizens and authorities (see Table 3: Flows of knowledge3).

Table 3: Flows of knowledge

	Category #1	Category #2	Category #3
Citizens participation	Citizens receive the information	Citizens are consulted	Citizens are empowered
Knowledge co-production		Feedback model of Knowledge exchange	Collaborative research/ Citizens Science
The knowledge flow			
Citizens role	PASSIVE	REACTIVE	ACTIVE
Case studies	Pollution Peak Emergency Plan	Environmental Impact Assessment	expAIR

We begin with two pieces of legislation, i.e. the pollution peak emergency plan (PPEP) and the regulation on environmental impact assessment for urban development projects (EIA). The analysis provides a background of how the role of citizens is traditionally seen in the context of the governance of air. We proceed with the analysis of the expAIR project, a participatory pollution-sensing and awareness-raising campaign conducted by the regional administration and a local civil society group. In the project citizens play a much more central role, and in that context, we observe its potential and limitations in the context of innovation, co-design and openness.

This analysis contributes in making the case for the Brussels Living Lab from two different and complementary perspectives. On one hand, by illustrating different ways of generating, disseminating and using policy-relevant knowledge on air pollution, the review sheds lights on the potentials and limits of a collective approach (i.e. expAIR) vis-à-vis other approaches. On the other hand, presenting and discussing the experience of expAIR, which is somehow the precursor of the Brussels Living Lab, will help drawing lessons to be learned and taken into consideration. We will focus on how the project has envisaged innovation and upscaling and how existing resistance was dealt with and possibly resolved. We will also look into how the procedure has incorporated co-design principles and to what extent social exclusion was minimized. Overall, the retrospective analysis offers a solid basis to situate the lab and to delineate both the key questions and the normative proposition of the exercise.

3.3. Case 1: Pollution Peak Emergency Plan

The first case study of our analysis is the Pollution Peak Emergency Plan (PPEP), one of the flagship initiatives adopted by the Brussels Capital Region in the domain of air quality and climate change. The plan is in line with BCR's earlier commitments to deal with pollution peaks (Bruxelles Environnement 2002) and to its legal obligation as stated by EU legislation on the topic (Directive 96/62/EC and 1999/30/CE of the European Council 1996, and 1999)[3]. The legal reference of the plan is a 2008 decree, promulgated by the government of the Brussels Capital Region, upon proposal of the Ministries of Environment and Mobility. The plan was adopted in the context of the preparation works for the EC directive 2008, which gave impulse to BCR and to the other regions, to legislate on the topic (Interview

[3] It ought to be noted that, at the time of the adoption of the decree, a new EU directive had already been adopted (Directive 2008/50/EC of the European Parliament and European Council 2008). This new directive repealed the aforementioned Council Directive 96/62/EC and 1999/30/CE, causing the end of their validity as of 10/06/2010. Considering that the legislative process to adopt PPEP started much earlier on, though, reference to the Directive 2008/50/EC was not included in the law.

1). In 2012, it was subject to a public consultation process, which resulted to an evaluation report being presented to the BCR government in 2013. In 2016, BCR published the Regional Plan on Air Climate and Energy (Bruxelles Environnement 2016), which refers to PPEP and expresses the government's commitment to carry out a comprehensive revision of it (Bruxelles Environnement 2016, 136).
The stated objective of PPEP is to avoid excessive concentration of nitrogen dioxide (NO_2) and particulate matter (PM10) in the atmosphere (BCR 2008, art. 1). To achieve its goal, PPEP establishes an action plan including different degrees of information sharing and government intervention, based on the level of pollutant concentration (i.e. thresholds): it includes one "information threshold", and three "intervention thresholds". According to the decree, in the case CELINE models indicate a risk of overrunning these thresholds, a procedure to activate the plan is adopted. The emergency measures mainly concern the transportation sector, and to a lesser extent the buildings sector (i.e. space heating). While threshold 0 can be activated the whole year long, the measures relative to thresholds 1, 2 & 3, can only be activated during the winter period (from 01/11 to 31/03), to avoid interference with the legislation referring to other environmental problems more typical of other seasons.

Figure 6: Timeline of PPEP

A number of different actors are directly involved in the implementation of PPEP. A central role is played by the Belgian Interregional Environment Agency (Fr: CELINE; Nl: IRCEL) that collects the data on contaminant concentration produced by the regional telemetric networks. In a situation when a specific concentration threshold is expected to be reached, CELINE informs the Ministries of Environment and of Mobility. These, in turn, are responsible to inform the public (i.e. through the media) and the lower-level institutions such as the municipalities and the police on the intervention threshold that might be reached, and on the measures to be taken if the forecast is confirmed.
The public is informed about a potentially harmful level of pollution through different channels. According to PPEP, the information shall be spread through at least two newspapers, two televisions and two radios in French and Dutch, as well as through the information screens that BCR and the STIB have available. In addition, a website is also active and regularly updated (www.qualitedelair.brussels), as well as an SMS and email alert service to which citizens can subscribe. We observe that information on air quality flows in one direction and citizens are passive recipients of information. With reference to the typology presented in chapter 3.1, PPEP is an example of Type #1.
The information that is provided to citizens as part of PPEP is relatively limited in scope[4]. First of all, the scope of PPEP is limited to two categories of pollutant, namely NO_2 and PM10, and to selected measurement parameters daily average concentration, and daily average of hourly concentration for PM10 and daily maximum of hourly concentration. This choice is due both to the possibility of the measuring technology at the time, as well as to need to find an interregional agreement on a common

[4] More detailed and technical information, beyond the scope of PPEP, is provided through the CELINE's website (irceline.be)

framework. It ought to be noted, however, that the EU directive to which PPEP refers to thirteen different pollutants, including six to be studied at an initial stage (European Council 1996, Annex I); and provides guidelines for selecting the ones to be considered: ranging from the possibility, severity and frequency of the effects, to the ubiquity and high concentration of the pollutant in the atmosphere, among others (European Council 1996, Annex III).

In relation to these two pollutants, moreover, citizens are only informed on one dimension, namely their level of concentration at the regional level (e.g. PPEP does not include information sharing on issues such as the impact on health of these pollutants, the sources, their geographic distribution). While the absolute value of PM10 and of NO_2 concentration is not provided as part of PPEP, two sets of scaled typologies are used to provide this information: the scale of four alert thresholds mentioned above, as well as an air quality index. The system of four thresholds is an important tool to frame the knowledge on air pollution, and to shape the intervention of the authorities (both in the form of dissemination of information and of the implementation of rules of conduct). It should be noted that the decision on the limit values of the different thresholds was based on different considerations, including both public health concerns and the sheer probability of reaching the thresholds. Threshold 0, in particular, is based on the EU limit value that should not be exceeded more than 35 times a calendar year for the protection of human health. Threshold 1 and 2, conversely, correspond respectively to the 95th and 99th percentiles of the time series taken as reference by CELINE. Threshold 3, finally corresponds to the maximum value observed by CELINE in the reference period (for PM10) and to the EU alert threshold (for NO_2).

3.4. Case 2: Environmental Impact Assessment

The systematic evaluation of the environmental impacts of new projects and activities, and the possibility for the public to comment and react to these evaluations, was part of the discussion between the regional administration and the environmental movement ever since the establishment of the Brussels Capital Region institutions. As far as the environmental impact of urban development project is concerned, the BCR relevant legislation has been brought together in the Brussels land-use code (CoBAT – *Code Bruxellois de l'Aménagement du Territoire*), under the supervision of the regional administration for Urban Development (*Bruxelles Développement Urbain,* BDU)[5]. At the more general level BDU speaks of environmental impact assessments – EIAs, which aim to "inform the public and the authorities […] on the positive and negative impacts of a project onto the environment and to propose solutions to limit possible nuisances" (urbanisme.irisnet.be). More specifically, CoBAT disciplines different kinds of EIAs: i) The "impact studies (IS)" and ii) the "impact reports (IR)", which are mandatory for public and private projects that can have a substantial impact on the natural or built environment, or have significant social and economic repercussions (CoBAT, art. 127); (it also provides for the Environmental Impact Reports (EIR) for public plans and programs, which are of different nature and are outside of the scope of this note).

CoBAT indicates that private entities intending to implement an urban development project need – upon approval – to submit the plan of the project to the regional authority, as well as an assessment of the environmental impact of the project. The code, more specifically, speaks of two different

[5] Note that major changes are about to take place, as a consequence of the reform of both of the administration and of the CoBAT. See (BCR 2017)

procedures that need to be followed, depending on the size, nature, location and potential impact of the project. For relatively small projects, private developers need to submit an "Impact Report" directly to the authorities, together with the demand of building permit. The dossier is then reviewed by the regional administration and published for public consultation. Larger projects are subject to a more cumbersome procedure, including a preliminary phase whereby the terms of reference of the environmental impact assessment (i.e. referred to as "Impact Study") are subject to public consultation. The results of the consultation are not legally binding and are only one among the elements that the regional administration uses to approve – or not – a project (e.g. the respect of current legislation, considerations on the socio-economic impact of the project…).

The CoBAT does not provide particularly specific instructions on how IR and IS are to focus on air quality. Indeed, the regulation speaks of project impacts as the "direct and indirect, short and long term, temporary, accidental and permanent effects on […] air". As mentioned above, IS foresee an ex-ante approval of the assessment ToR, in virtue of its larger scope. This might offer the opportunity to the decision makers or the public to request specific attention to air related issue. As far as IR is concerned, a vademecum is made available by BDU, illustrating how the report shall touch upon the different impact area (inter alia, the vademecum emphazises that *all* impacts specified by CoBAT should be touched upon by IR). BRAL expert on EIA told us that notes that in practice, air quality issues have been rarely taken into account, with the exception of projects that include engines and machinery that directly produce exhausts fumes (Interview 3). Other issues with a possible impact on the quality of the air (e.g. higher car traffic volume induced by the project) might be included in other sections of the assessment, but are typically not referred to as sources of pollution. Similarly, decision makers seem to give very little consideration to the prospected impact on the air. BCR administration estimates that some 300 IS have been conducted since the establishment of EIA in 1993, whereas about 180 IR are submitted every year.

We observe that the possible contribution of citizens is mainly limited to the consultation phase, where citizens can provide feedback to the assessment produced by the developer. With reference to the typology presented in chapter 3.1, we observe that, during this phase, citizens are deemed to *react* to information and knowledge produced elsewhere, as illustrated in Category #2 of our typology. Information on the expected impact of a project is provided by the applicant (or by experts hired by the applicant), who has the incentive to downplay the negative impacts of the project; and anyway has the power to set the agenda by focusing on certain issues rather than on other. In the case of the Impact Study procedure, citizens are given the opportunity to provide inputs also to the terms of reference of the assessment. This is important as it gives citizens and the civil society longer time to organize and produce reactions to projects; more importantly, it allows citizens to influence the scope of the assessment, requesting information on aspects of particular interest, or on sensitive issues (what Glucker et al. (2013, 107) would refer to as value-based knowledge).

The COBAT does not pose any formal barrier to participation in the public consultation, and citizens do not have to justify in any way whatsoever their willingness in participating in the process. In practice, however, the situation is more complex and several issues play a role in determining who actually participates (Interview 3). A key element concerns the way the information is made available to citizens. Publicity is only compulsory in the form of red posters to be displayed in the area where the project will be developed, which implies that often concerned people are not even aware of the fact that a project proposal has been submitted and that an inquiry is taking place. In addition to that, information

relevant to the project is only communicated at the time the inquiry starts, and the time actually available to provide feedbacks is very limited (e.g. a project's dossiers needs to be asked in person at the council house, which is only open one evening a week; and often it can only be consulted on location, depending on the good will of the city's employee). A meaningful participation to the inquiry, moreover, requires the availability of resources, such as time to dedicate to it, the capacity to understand the often very technical dossiers and the possibility to have a long-term perspective, which not all citizens dispose of. "Citizens are completely on their own" says (Interview 3), emphasizing how the absence of *de jure* exclusion mechanisms, does not translate into a *de facto* inclusive process.

These conditions imply that the citizens and the groups that eventually participate are a limited subset of the population (and typically always the same). In middle class and rich neighborhoods, citizens are more active in participating in the discussion concerning development projects. In these areas, residents often have the resources to spend in participatory processes, and also their basic concerns are seemingly different: "they don't have to worry about school and food and employment… they are concerned about the view from their houses" (Interview 3). Another factor that influences the participation is, rather obviously, the relation of citizens with a certain place, i.e. people who live or work in a neighborhood are more willing to have a say in how the area develops. An issue of scale is also in play here, where depending on its size and impact, a certain project might be framed in a way that attracts concerned citizens from the neighborhood, the commune or the region.

Given the marginal position of air quality issues within the EIA processes, it is difficult to make meaningful considerations on how this legislative instrument actually contributes in addressing pollution problems. The impact of individual projects on urban air quality is relatively small, possibly too small to motivate a reaction by citizens. In addition to that, the lack of a fine-grained picture of the quality of the air implies that a project's impact on urban air quality might even be underestimated. In this context, a greater knowledge on air quality might be a good step forward.

3.5. Case 3: expAIR

The third case study that we will introduce in this review is the "expAIR project". As opposed to the previous case studies, concerning the legislation of the Brussels Capital Region (BCR), this case study focuses on a project that was carried out between 2013 and 2017 under the leadership of the air lab of 'Brussels Environment – BE'. The core of expAIR, and its main innovative element, was the measurement of the city's air quality through eight high-detail wearable devices.

This is in line with an emerging approach to sense and measure air pollution, namely through the use of portable micro-scale sensing devices carried by citizens. The systems of fixed stations that currently represent the most common way of monitoring pollution (e.g. what is being used for the PPEP, see Chapter 3.3), in fact, is proven to be only partially successful in providing the broad range of data needed for effective air quality management. For instance, while they often produce high-quality time-series data, they only present approximate spatial resolution. This, in turn, makes it necessary to rely on modelling approaches to produce representative and reliable information for a whole urban area. The deployment of low-cost sensors in significant numbers, in turn, could provide more accurate inputs, help detecting pollution hotspots. Most of all, however, wearable devices allow to get a more accurate picture of people actual exposure. While a number of challenges still exist, the approach seems to have a potential of contributing significantly to the conventional approaches and it is being adopted in multiple cities (e.g. see Kumar et al. 2015; Theunis, Stevens, and Botteldooren 2016).

In the first two years, the devices were carried by employees of the regional administration in their daily routines. In 2015, BE decided to include in part of the activities the local association BRAL, with the objective of making the process more participatory and more citizens-oriented. BRAL's role would be to mobilize volunteers to conduct a measurement campaign with four of the devices (the remaining four would still be used by BE), and to work with them to develop a better understanding of air pollution among the participants and the broader public. The collaboration with BRAL triggered a fundamental change in the nature of (a component of) the project: namely it enabled a process of co-production of knowledge on air quality and of civic engagement to finding solutions to pollution. Our note focuses on this "participatory" component of expAIR, i.e. on the activities conducted in collaboration with BRAL and the citizens (we refer to it as expAIR 2.0).

The objectives of expAIR 2.0 were i) to complement existing scientific knowledge on air pollution in the region, on its geographic distribution and on its impact on human health; and ii) to raise awareness among citizens on issues of air pollution, thereby stimulating individual and collective action for better air quality (e.g. through changes in the current mobility framework, public health, regulations…). Considering these objectives, activities included an element of knowledge generation (e.g. air quality mapping) and of knowledge dissemination and "use" (e.g. awareness raising, training, demonstrative activities…). Overall, BE would make available four portable measuring devices and carry out the data analysis and reporting, while BRAL would work on the mobilization and training of citizens' groups to carry around the devices and to raise awareness about the issues of air pollution with the broader public. Table 4 illustrates the different phases of the project.

Table 4: expAIR 2.0

1	**Choice and purchase of devices** As mentioned above, expAIR 2.0 counted on the devices made available by BE (microAeth Model AE51 aethalometres measuring Black Carbon, connected to a GPS tracker). Measuring concentration of Black Carbon is relevant because of its proven negative impact on human health, and since BC is considered to provide a good proxy of a broader range of traffic related emissions.
2	**Pilot test – Participants mobilisation and measurement** Project participants were mobilized by BRAL, following their own consolidated practices of citizens' engagement. For the first measurement round, five participants were mobilized through a call for contribution in the network of BRAL and of the staff working on the project. A series of measurements were conducted by these participants circulating during five consecutive days from morning to evening, carrying on the measuring devices. Two measuring sessions were conducted in June and in December 2015. The data were collected and analyzed by the air lab of BE and used to map air quality and pollution in Brussels.
3	**Participants mobilization** In 2016, a different approach was taken, which developed the aspect of citizens' engagement beyond the mere measurement campaign. Three groups were established, with some 50 people taking part in the project. The choice of the different groups was done in view of engaging with people somehow representative of the broader urban socio-economic context, i.e. from middle/high class international officers, to the middle class, to socially vulnerable citizens. Following a series of meetings useful for BRAL to communicate about the project and for the citizens groups to consolidate, the groups started to meet regularly (i.e. weekly during one month, and after a two months' break, for another month).
4	**A collective learning process** At every meeting, the devices would be exchanged among participants and the data collected by BE staff. The data would be analyzed by the BE air lab to map air quality and pollution in Brussels. In particular, individual reports were produced and handed in to the participants, whereas a global report would be published on an annual basis (at the time we write, only the report of the 2015 campaign was made available (Heene et al. 2016). During the meetings, participants would also engage on a discussion on air pollution in Brussels, sharing their personal experience and perspective, as well as the results of the individual reports.

5	**Awareness raising and knowledge dissemination** As part of the project, participants also engaged in a number of activities to mediatize their experience and raise awareness beyond the project participants. These activities were (at least partially) organized during the project meeting and were a natural outcome of the group discussion to share the learning experience and contribute to a common urban knowledge. In these initiatives, situated in their citizen practice, project participants would become the experts, questioning other people about air quality, and transmitting their experience and knowledge. In this context, the role of BRAL has been in term of sharing its expertise in raising awareness and communication, to empower the project participants and make them ambassadors toward the rest of the city. More details of these activities are illustrated in the section unterhalb, on project results.

Project results & analysis

At the time we are writing, a key outcome of the ExpAIR is the report and the maps that BE produced in February 2016 with the data collected by the citizens group (Heene et al. 2016, available at: bral.brussels/en/artikel/expair-project-citizens-demand-clean-air). The report was written, using the data collected through the portable devices, and to a lesser extent the data from the BCR telemetric network. The report presented a series of different results, on the pollution levels recorded within the perimeter of the 2015 measurement campaign (Brussels city center, referred to as the "Pentagon"). These include both the geographic distribution of pollution in different streets and boulevards, and the level of personal exposure, making the distinction among different modes of transport. While it includes some elements of interpretation of the causes of distribution of Black Carbon (i.e. proximity to and intensity of traffic, site configuration, meteorological condition), the report does not provide any indication on its health impacts, in particular, in the places where a higher concentration was recorded. The report only received attention from the press in the fall 2016, when air quality was more prominent on the public discussion, it was also presented to the public in October 2016 during an event organized by BRAL (see below).

Another important result of the project consists of the series of public initiatives, organized by the citizens group. While they were not *strictu sensu* part of the expAIR project, they represent an important result from the process of learning and empowerment that expAIR allowed. These include experts' lectures and roundtables, radio broadcast, a city-wide demonstration[6]. In some cases, they were moderated/facilitated by BRAL, while in other cases the organization was left to the participants themselves. The project also attracted the attention of the press, and different articles, radio and TV emissions were published.

- **Overcoming resistance to innovation and innovation achieved**

As opposed to other approaches to measuring and governing air, presented above, expAIR was innovative both in terms of the technology used (wearable devices) and in how it engaged citizens (participatory approach to knowledge generation). As a consequence, the project contributed to expand and refine knowledge on the drivers, the impacts, and geography of pollution (e.g. more details on actual exposure to Black Carbon in selected areas), and at the same time to spread this knowledge among citizens raise awareness on the key issues at stake (i.e. more people know about air pollution). In addition to that, the project also contributed to re-discover and to legitimize citizens' expertise, both by the media and policy makers. While it might be still too early to evaluate the full impact of the

[6] A complete list updated in real time can be found here: https://cdn.knightlab.com/libs/timeline3/latest/embed/ index.html?source=1H0VN9sT47bGETW5GNFb7bA5d_TvM-8FRwigN0uvdGsE

project, it is possible to present some reflections on its contribution to the broader dynamics of the governance of pollution in Brussels, i.e. its upscaling potential.

Looking at expAIR as a niche where a limited number of citizens co-produces knowledge on and solutions to air quality issues, the process of upscaling can be understood in many different and yet non-exclusive ways. In this context, it is not clear whether and how a process of upscaling was explicitly anticipated by the project initiators and, if so, which kind of scenario was envisaged.

- Upscaling could refer to a growth in the number of citizens taking part in the process with more devices and more citizens meetings. In this sense, a significant barrier was the cost involved in developing the project, including expensive measuring devices and a process of mobilizing citizens particularly time intensive both for the intermediary (i.e. BRAL) and for the citizens themselves. Considering the demand by citizens to get engaged in the process greater than the possibility for them to do so, it seems that the availability of interested participants was not an issue. In spite of this barrier, the project is somehow scaling up, the SmarterLabs project being a venue for this to happen.
- It could also refer to a process by which the knowledge co-produced by some citizens becomes a body of knowledge that is shared city-wide, and that is used in the context of relevant policy making. In this sense, the answer seems to be more complex and is the subject of further research. The mediatization of the learning process by participants and BRAL through personal networks, public events, and the media was instrumental in disseminating the knowledge co-produced in expAIR. Overall, considering that about 50 people took part in the project, BRAL estimates that some 500 people were directly reached out (excluding "indirect" outreach through radio broadcast and the news). BRAL staff, however, notes that despite the efforts by BRAL itself and the citizens engaged, it was difficult to reach out beyond the 'usual suspects', namely the citizens already somehow environmentally aware and engaged in civic activism (Interview 2).
- Upscaling, finally, could refer to the development of a more participatory management to the urban air, and more generally to a more collaborative approach to the governance of the urban commons. In this sense, we observe mixed results. On one hand, the full engagement of the university as project partner in a new citizen science project on the same domain (i.e. Brussels Living Lab), and the replication of the approach in the context of fund raising and project proposals by other groups (e.g. capaCITY project proposal in the context of Innoviris Co-create call) are both an expression and a cause of successful upscaling. The manifest hesitation of BE to provide full and "official" visibility to the project results (e.g. these are available on BRAL website but are given little to no visibility on the BE website), conversely, seem to be a significant barrier (constraints #5 & #6, see Table 6).

- **Lessons learned**

Reflections on the expAIR project, i.e. on what did work and what did not were particularly important in the design of the Brussels Living Lab. In the context of participants' mobilization, the strategy consolidated in expAIR proved to be more effective than the pilot phase (civil society identifying and supporting community organizers, rather than directly organizing the community of users). Even if the approach remains extremely time consuming (and necessarily so), it was chosen to replicate it in the context of the Brussels Living Lab and beyond.

Another key element, that was highlighted by project participants and by BRAL concerned the technology supports used for expAIR, i.e. the devices to measure BC. As mentioned above, the devices would not provide the participant immediate feedback on its exposure to pollution: the data collected by the device would need to be downloaded by an expert, analyzed in the laboratory, and returned to the participant in the form of an individual report at a later stage (about a month later). The compilation of all individual measurement would be returned even later (i.e. February 2016 for measurements taken in June and December 2015; expected September 2017 for measurement taken in September to December 2016). As part of the Brussels Living Lab, in turn, the choice was made to purchase cheaper and more user-friendly measuring devices, allowing participants to have a real-time visualization of the results of the measurement.

- **Co-design**

In expAIR 2.0, citizens were invited to participate throughout the project, either directly or through the mediation of BRAL. They were invited to co-produce the knowledge on pollution by carrying the measuring devices, and participate to the ongoing discussion on air pollution in Brussels. The role of citizens, moreover, went beyond the exercise of collecting and discussing data on the geography of black carbon: By presenting the results of their work through their networks, public meetings, and the media, the project participants contribute to develop the body of shared knowledge on air pollution. With reference to the typology presented in chapter 3.1, we observe that expAIR is a case where citizens co-produce the knowledge and the project, as illustrated in Category #3 of our typology. Citizens' role was mediated by BRAL during the project design phase, and was central in all the project activities.

- **Openness, reflexivity and public value creation**

The strategy to mobilize the citizens and to build the groups was designed and implemented with the objective of including the most diverse participation, i.e. minimizing exclusion was one of the explicit objectives of the project (this refers to the anticipation of constraint #1, see Table 6). Considering the situation of Brussels, in particular, different exclusion sources of possible exclusion were anticipated, and particular attention was taken in the design and in the participants mobilization phase: these include the lack of resources to participate in the Lab (e.g. financial, temporal, intellectual resources), to the (self-)exclusion of groups having objectives and motivations not matching the project expectations, to the exclusion based on residence or on belonging to different constituencies (e.g. residents-vs.-commuters, local-vs.-regional institutions, French speaking vs. Dutch speaking). Notwithstanding the efforts to minimize exclusion, a number of issues were still observed. In particular, we can speak of exclusion mechanisms that prevented people to participate in the project (exclusion from the project) as well as other mechanisms that prevented participants to the project to contribute fully to the discussions (exclusion in the project).

A key driver of exclusion that was observed in the project was indeed the lack of resources to participate. While the participant mobilization strategy was designed, and carried out to minimize this source of exclusion (e.g. information meetings were conducted in venues where more deprived social groups are likely to be found; extra time and resources were spent to develop a citizens group issue precisely from these venue), BRAL staff told us how the lack of time still represented a significant barrier at all levels of income (Interview 2). Another driver that was observed was the self-exclusion of

groups seemingly not interested in participating in the project. In some cases, institutions which were invited to participate, refused to do so (exclusion from the project). In other cases, individuals did join the early stages of the discussion but were disappointed by the objectives agreed within the group (e.g. people with a particularly strong spirit of confrontation against other citizens or the authorities were marginalized stopped participating) (exclusion in the project). In addition, a number of other issues were observed (Interview 2). A key source of exclusion, for example, was the replication of external power relations and hierarchies (e.g. status, professional situation, level of seniority, gender…) into the group dynamics, in spite of the explicit effort to building horizontal relations. Another element was the "experience in citizenship" (Fr: "expérience de citoyenneté"), whereby for those with pre-existing experience it was easier to integrate in the groups dynamics.

3.6. Concluding remarks

In the paragraphs above, we provided an overview of the governance of air quality and pollution in the Brussels Capital Region, and of three initiatives that help illustrating different approaches to the generation and management of policy-relevant knowledge. Rather than comparing three different participatory approaches among themselves, we proposed a review of two pieces of legislation (PPEP and EIA) and of a Living Lab-like initiative expAIR, to emphasize how the latter was innovative and brought in considerations for innovation, co-design and openness.

In line with SmarterLabs' analytical focus, we can assess the three different initiatives against the criteria of social inclusion and exclusion, and the scale achieved city-wide. Thinking of inclusion as the extent to which citizens play a role in the context of generating policy-relevant knowledge (i.e. inclusion in the process), the respective position of PPEP, EIA and expAIR reflects immediately the typology we proposed in chapter 3.1. Within that framework, inclusion in PPEP is minimal and citizens are passive receivers of knowledge; in EIA citizens are included to a certain extent, albeit at a late stage and in a rather re-active position; in expAIR, finally, citizens' role is fully recognized and inclusion is maximized.

As far as the scale dimension is concerned, we observe the reversed picture. As a frame of reference, it is possible to look at the people and the areas that are (at least in theory) concerned by the initiative as a measure to define the level of upscaling. In this context, we observe a situation where the upscaling potential of PPEP and EIA is fully realized, i.e. both are institutionalized and have implications constraining the whole population, respectively with a more regional and local scope. ExpAIR, on the other hand, is a niche, that only touches a limited amount of people and their individual and collective practices, and whose upscaled scenario is still largely a potential.

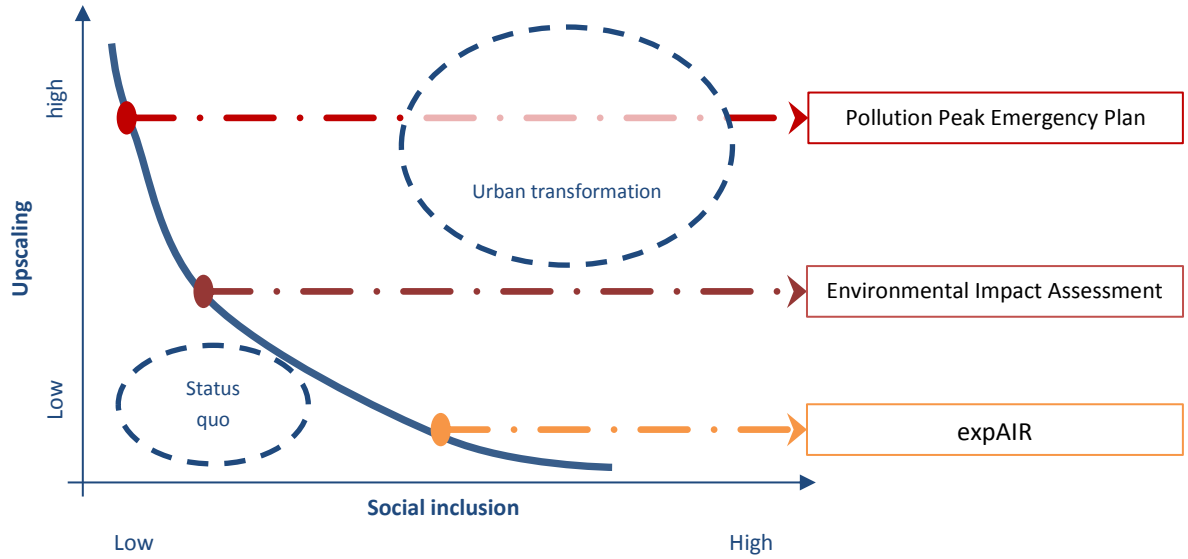


Figure 7: PPEP, EIA and expAIR in the context of social inclusion and upscaling

If we evaluate the three projects in terms of the extent they realized a large-scale transformation of the practices and the governance of regional mobility, none of them seems to be completely successful at the time we write. In the last 10 years, nevertheless, there seems to be a mounting attention for air quality, among policy makers and citizens alike. New policies and projects are in the pipeline and about to be enacted (e.g. low emission zone, Brussels Living Lab, a number of other citizen science projects on air quality…): among other things, they build on PPEP, EIA and expAIR; and they (partially) reproduce the approach to knowledge production and management which we introduced above. In this context, the Brussels Living Lab is an important testing ground, and whether the inclusionary approach it preconizes will be instrumental toward greater transformation is one of the main questions to be answered in the years to come.

4. Graz

4.1. Governance structure in Austria and the City of Graz

Austria is a federal republic and follows the principle of local self-administration of its municipalities. There are three levels of territorial authorities: (1) the federal government of Austria, (2) the federal state administrations of the nine states, and (3) the municipal administrations of 2,100 Austrian municipalities. These three territorial units are governed by four levels of administrative authorities: (1) federal government, (2) federal states, (3) districts and (4) municipalities (Bundespressedienst 2000). The 79 districts of Austria are organizationally integrated in the federal state administration (79 district commissions) or with the greater cities (15 statutory cites) (all data as of March 2017).

The different states and ministries have their own responsibilities as well as sectoral and regional forms of collaboration that are established voluntarily. The individual ministries have specific agencies or companies that support their tasks. Consequently, there is only little cooperation between agencies, departments and authorities. For fostering institutional partnerships, the office of the federal chancellor founded 25 development organizations in Austria. This administrative framework for collaboration supports regional stakeholders in initiating bottom up strategies and corporate projects for regional development.

In Austria, municipalities act as independent territorial authorities with autonomous rights. Their individual spheres of activities are defined by the constitution (social services, public order, urban planning, water, sewage, roads and household refuse, urban transports). In the City of Graz, two bodies of local government make the important decisions: the City of Graz Council with 48 members (currently divided among six parties), and the 7-member City of Graz Senate. The residents of Graz elect the City Council for a 5-year term, which then elects the Mayor and the members of the City Senate. The City Council meets once every month (except during the summer recess) and its meetings are open to the public. The municipal government of Graz consists of the Mayor, his deputy, and five city councilors, who together form the city senate. The city senate is responsible for all matters entrusted to it by law or statute of the provincial capital of Graz and for all matters pertaining to its own activities, for which no other municipal body is responsible.

Guidelines for citizen participation

In the last years, urban governance in Graz is changing, shifting from “government municipality” towards “good governance” in an ongoing process. This includes the establishment of new policies and mechanisms (e.g. social spatial development concept, trainings for civil servants) as well as re-organization/foundation of departments. One aim is to establish transparent structures that make it easier to initiate and get involved in participation processes. In fact, Graz rather early recognized the value of citizen involvement and already applied participatory methods for certain projects. Citizen participation in projects of the City of Graz means that there is some creative leeway/freedom with a project of the city, and the city invites the citizens to join in the preliminary discussions about decisions and to bring in their points of view and their concerns. The final decisions are made by the political bodies according to the rules of the charter of the City of Graz. To continue and foster this participatory approach, from 2013 to 2014 guidelines for citizen participation were developed in an open participatory process (including workshops, meetings etc.) involving 400 inhabitants of Graz. From 2015 to 2016 they were tested and evaluated by the University of Graz.

The guidelines consist of three main areas: information through a public *project list*, preparation and realization based on *participation concepts,* and encouragement of citizen participation by the instrument of *formal motivation*.

- With the **project list** the City of Graz wants to inform the citizens about important city projects. The project list itself does not constitute an offer for citizen participation but is an information platform to show, among other things, where the City of Graz offers participation and where not.
- High quality participation needs clear, transparent and reliable frame conditions for all protagonists, from preparation to implementation. In order to include as many perspectives as possible into the preparation, the **participation concepts** are submitted to the corresponding local agents, advisory councils and city representatives, asking them for their opinion. After this consultation step, the participation concept is submitted to the responsible political panels for a resolution.
- The instrument of **formal motivation** offers the possibility to initiate a dialogue about citizen participation where the city did not envisage participation. With the support of at least two of four defined groups (citizens, local agents, local councils, migrant advisory council) they can prompt the city to re-check whether there is a chance for participation that can be offered contrary to previous considerations.

For the SmarterLabs project the guidelines for citizen participation offer the possibility to analyze and compare past projects and investigate the development especially in terms of institutional upscaling.

4.2. Selection of case studies

The three case studies for the retrospective analysis selected in Graz each relate to the re-design of a square or street in terms of mobility aspects. All of them have a connection to the current Living Lab at Griesplatz (WP4), be it due to geographical proximity or the applied methods for citizen involvement.
The first project was carried out at Griesplatz around 2001 – the same square that is going to be changed through the Living Lab during the lifetime of the SmarterLabs project.
The second case concerns the re-design of a street in the city center in 2004, including big constructional changes that were developed and concluded through a planning cell/citizen appraisal coordinated by an external party.
The third project analyzes the transformation of a chaotic roundabout close to the university into a shared space, which favored pedestrians and cyclists. It was the result of a short open process involving citizens and proved positive effects.
The retrospective analysis is based on official documentations published by the City of Graz and involved institutions and interviews with civil servants of the City of Graz.

4.3. Case 1: Griesplatz/EU URBAN Program

The Griesplatz is an important square in the urban center of Graz, which serves various purposes: private vehicle mobility, public transportation, pedestrian and cyclist zones, local goods supply, housing and many services and institutions of all sorts. Situated on the west side of the river Mur, the district Gries ever since suffered from social, economic and structural deficits, with education level

below average and high percentage of foreigners (ca. 25 % in 2001). Within the EU-funded URBAN program (1996-2001) the City of Graz tried to improve the situation by applying a set of over 50 measures attached to different priorities (i.e. district development and infrastructure, social network and employment, participation and knowledge exchange). From a mobility perspective the re-design of the northern part of Griesplatz is of special importance for the SmarterLabs project.

- **Overcoming resistance to innovation and innovation achieved**

URBAN was the first big EU funded program in Graz and triggered a lot of initiatives in the district of Gries ranging from small activities such as organization of social events to bigger actions such as the design of a green area ("Oeverseepark") or the renovation of the northern part of Griesplatz. In that sense the achieved innovations ought to be seen in the context of a big variety of measures and not isolated. The two mentioned projects were explicitly considered for learning and testing project management and citizen participation. The URBAN program was externally evaluated (during and after its lifetime) and in addition the City of Graz contracted the University of Graz to scientifically analyze the whole process. Recommendations were adopted by the responsible actors and departments after URBAN ended and can be seen as one step towards institutional upscaling.

- **Lessons learned**

The general evaluation after the URBAN project showed that there was an overall improvement in most of the addressed issues (some exceeding expected goals while others were behind or delayed). One reason for not reaching envisaged goals was "underestimation of the challenge" by dedicating too little resources and time to certain actions. Another obstacle was that several departments were working on the same project each with their own responsibilities thus lacking coordinated actions. Through the URBAN project, however, awareness was created among city actors and departments to work closer together in the future.

After 2001 it was clear that the URBAN project was not the end of the story and the district of Gries remained an area in need of special treatment and support for the future. In retrospective view, URBAN can be considered the start of a set of initiatives that turned something to the positive while certain experiences proved that further intensive activities would be necessary that would imply also more participatory approaches to live up to the variety of people's needs in the district of Gries.

- **Co-design**

The URBAN project was coordinated top-down, with possibilities for participation in selected activities (Oeverseepark, Griesplatz). In fact, citizen involvement at Griesplatz was narrowed down to a survey and a following architect competition with six invited architects. The realization of the final proposal for a re-design of Griesplatz would have been more costly than expected, so only the northern part of Griesplatz was adapted; all other actions (that would have included broader traffic concepts) were postponed or stopped. Eventually, since then (2001) there was no progress at Griesplatz. Among local residents this led to a feeling of promises are not being kept which is existent until now and hinders participation as people tend to think: "Once again there will be no outcome." To get things going again a Living Lab was started in 2015 (action research experiment in WP4), this time with a broad strategy for participation.

- **Openness, reflexivity and public value creation**

One main goal was to promote the actions in the URBAN project to the public, in order to create awareness and foster a more positive image for the district. Due to huge efforts in dissemination activities, at the end of its lifetime, in 2001, 33 % of local residents knew about URBAN, however, the percentage among people coming from abroad was much lower, which indicates that this part of the population was not addressed sufficiently.

Taking into concern the heterogenic population in Gries special attention was paid to women and foreigners (e.g. employment program for non-Austrian residents). However, the latter group was mainly addressed indirectly through citizen groups (i.e. NGOs), which might have been a reason why they had a rather negative attitude towards the URBAN project or did not know about it. Therefore the goal of "integration" could not be considered as successfully achieved.

4.4. Case 2: Neutorgasse

Neutorgasse is a street close to the city center of Graz which serves various purposes. It hosts several small shops in the ground floor, which are located behind beautiful old arcades, and is at the same time a residential area. From 2002 to 2004, when this project was carried out, but also afterwards, cars were allowed to go in one direction and could park at both sides of the street, which is of importance as Neutorgasse is at the border to the pedestrian zone that dominates the whole city center. It was a request in the city council about changing the whole Neutorgasse into a pedestrian zone too, which was the reason for the city of Graz to say that the citizens should decide. Also plans to move a tramline from an adjacent street to Neutorgasse existed at that time (later neglected by citizens). Table 5: Central facts for project Neutorgasse gives an overview of the project's most important issues.

Table 5: Central facts for project Neutorgasse

Objective	Content: decision pedestrian zone: YES/NO; recommendations for constructional implementation Governance: Gaining experience for use of participatory methods
Stakeholders	Residents in Neutorgasse, experts, representatives of certain groups (e.g. economy), inhabitants of Graz
Conditions	Construction of a tram line must be left possible for future
Time frame	6 months for participatory activities

As can be seen in Figure 8, the river Mur is close by (bottom), even though there is another highly frequented street between Mur and Neutorgasse. The final planning made that street subterranean so that there was a direct connection from Neutorgasse to the river including a small park and "balcony" as attraction and viewpoint.

Figure 8: Satellite view of Neutorgasse (center) in 2002 with drawn suggestions during the citizen appraisal process (Source: forum b)

- **Overcoming resistance to innovation and innovation achieved**

The innovation in this project was mainly in the way how the decision finding process was organized from a governance perspective. The variety of stakeholders with different interests in Neutorgasse entailed some space for conflicts. Therefore the local government took the decision for a participatory approach which comprised a series of events and workshops. For the first time in Austria the method of a planning cell with a following citizen appraisal (Planungszelle/Bürgergutachten) involving 65 randomly chosen inhabitants from Graz was applied. By putting the organization and supervision of the process in the hands of an external company, the project's image was more neutral and possible resistance could be avoided right from the beginning.

The project can be seen as one of the first steps of the City of Graz to introduce a culture of participation with the intention to scale it up at institutional level. The responsible city actors gained knowledge and experience, which could be applied in later projects again. In addition, the involved citizens acted as multipliers during the consulting process and continued to do so also after the project thus "infiltrating" the population with knowledge about participatory city planning.

- **Lessons learned**

Certainly, the exchange between citizens, experts and politics supported by an external neutral party can be regarded as a success in the described case. There exist various methods for participation that depend on the specific circumstances and objectives and it seems wise to delegate the project lead to experts in order to choose the most appropriate method. As explained in a concluding paper released by the external project coordinator such a participatory approach needs preparation and commitment by the politics in charge. One important task is to inform people about the project before and after the actual participatory activities. Critique was attributed to the rather small time frame in the forefront of the activities (e.g. time between invitation and event).

From a city perspective the lessons learned can be summarized as to be courageous to trust in innovative methods and be open to the outcomes of participatory processes. The open governance approach by the City of Graz was appreciated throughout the participants' feedbacks.

As mentioned above the initial reason for the participation process was the question about a pedestrian zone. During the meetings, the participants quickly emphasized that a majority of them was against a tramline in Neutorgasse, which was actually not a question on the agenda. From a broader city planning perspective a tram line in Neutorgasse would take away pressure from adjacent streets and improve traffic situation on a bigger scale. However, with the participation process it became clear that this was no longer an option. As a conclusion it can be stated that decisions which favor a greater interest but might be uncomfortable to some are not always appropriate to be opened for participation among that smaller group ("Not in my backyard!"). This highlights the dilemma of participation versus representative democracy and the question whether elected politicians can overrule participatory decisions or are supposed to accept them.

Although the participation process itself being successful in Neutorgasse, the approach of a Planungszelle/Bürgergutachten has not been replied in Graz since then. This might have to do with the preference of different forms of participation in other projects. However, the basic principle of participation was affirmed and the experiences from this project led to further participatory processes and – even more important – to a more structural implementation of strategies for participation in Graz.

- **Co-design**

As previously explained, it was a top-down idea from the local government to involve citizens for the new design of Neutorgasse. The applied method of a planning cell/citizen appraisal fulfilled the criteria of a co-design approach and was evaluated positively both by citizens and politicians. Some critical decisions (e.g. pedestrian zone: YES /NO, tramline: YES/NO) were taken which were broadly accepted due to the high legitimacy of the process.

- **Openness, reflexivity and public value creation**

There are various stakeholders with different interests in Neutorgasse who were involved over a period of several months in different events. The first step by the City of Graz was to organize an open information event in late 2002 to inform people about the planned project and gather first opinions. In a workshop one week later with all groups of stakeholders attending (96 invitations resulted in 20 persons present) further desires and special necessities were collected. With these results as a first input the planning cell was started, which took place during two days and one evening.

The planning cell method was developed by Prof. Dienel at Wuppertal University in 1977 (Dienel 2002) and has often been applied and refined since then. It unites a group of randomly selected citizens during a limited amount of time and confronts them with problems to be solved. A constant interchange in small groups should guarantee unbiased results and a variety of opinions and suggestions coming up. The whole process is guided by a neutral facilitator who at the end summarizes the findings in a citizen appraisal that contains 1) open suggestions as well as 2) binding recommendations for the city government.

The selection of the involved citizens was done on the basis of the city's register randomly. 1,500 invitations were sent out, 7 % (103 persons) replied, and finally 65 showed up at the event. The sample could be considered big enough, representing all groups equally in terms of gender, age and profession. However, each invited person could decide upon their participation voluntarily which leads to assume that a majority of those who joined the meetings had a personal interest in Neutorgasse and thus

cannot be considered completely neutral and unbiased. The City of Graz offered compensation for participants' expenses, so that they could leave work for one day. There was no special attention paid to non-German-speaking citizens and all events were held in German only.

4.5. Case 3: Sonnenfelsplatz

Sonnenfelsplatz is a highly frequented square in the university area of Graz (960 vehicles, 3,400 pedestrians and 640 cyclists per hour) that was re-designed in 2011. In the need of urgent renovation, the City of Graz hired a planning team already with the idea in mind to install a shared space. The planning team suggested to involve citizens in a short intensive decision-making process (*Charette*), which was carried out during five days in 2009.

By eliminating almost all traffic signs and thus assigning equal rights to everybody, individual awareness was raised and average speed was reduced. Pavements were eroded and substituted by colors as a kind of guiding design (see Figure 9). The "democratic" interaction of cars, cyclists and pedestrians was well accepted and led to a reduction of accidents.

Figure 9: Shared Space at Sonnenfelsplatz (Source: Fischer/Falk)

- **Overcoming resistance to innovation and innovation achieved**

The innovation in this project was the applied methodology of participation as well as the innovative traffic concept of a shared space. The initial decision for this model was taken by city representatives and politicians after a couple of visits to other countries (i.e. The Netherlands) which convinced them to apply it for the Sonnenfelsplatz. The numbers of cyclists and pedestrians (higher than those of cars) in combination with the ambition to favor these non-motorized groups were the main reason why a shared space seemed ideal for that kind of square and traffic situation. In 2011 when the construction was done, it was one of the first shared spaces in Austria; in the meantime they are becoming increasingly popular and at the same time accepted.

From the perspective of upscaling, the concept of a shared space could probably be realized more often in Graz. However, this was not the primary intention here, although the gained experiences could

influence future decisions towards that model. What was certainly more relevant in terms of institutional upscaling was the short open participatory process. The short amount of time and rather cheap organization with positive outcomes could be promising for future projects.

- **Lessons learned**

The short and intensive *Charette* showed that it is possible to reduce planning periods to a minimum of time and nevertheless involve stakeholders and citizens. Requirements are the support of the city government and political consent on the overall idea for the project. Relevant stakeholders have to agree to participate in the process and it has to be clarified in advance what is part of discussion (creative freedom) and what is not. To guarantee a smooth process and avoid misunderstandings detailed preparation in terms of organizational issues and content is essential before the short planning event. In order to provide a neutral setting the *Charette* itself needs a professional external facilitator, who is a crucial factor for success or failure.
In retrospective view, the Sonnenfelsplatz project can be considered as one more step towards establishing the city-internal guidelines for citizen participation that are in place since 2015.

- **Co-design**

The City of Graz hired a planning team consisting of eight persons including city planners, traffic planners, water and light experts and a sociologist as facilitator/moderator. This group was supposed to develop a new design of Sonnenfelsplatz, and therefore suggested to organize a short intensive decision-making process in the form of a *Charette*. Hence, the City of Graz organized a five-day-planning event in a public Café and made the process visible and accessible. As the experts were developing the new square, interested people could come by and have a look. At three evenings during the five-day period all relevant stakeholders were invited for a public discussion in the Café offering possibilities for feedback. At the last evening the final concept was presented and handed over to the city government.
The organizers took special care to involve all groups of people, including local residents, shop owners, traffic operators, associations for handicapped persons and interested citizens. Especially the association for blind people expressed their satisfaction with the final result.

- **Openness, reflexivity and public value creation**

The *Charette* was designed as an open process accessible for everybody. Certain groups of people were addressed explicitly (local stakeholders, handicapped people). There was no special attention given to other minorities, which seems acceptable due to the fact that Sonnenfelsplatz is located in the university area district which can be considered home to higher educated and richer people. From the point of view of political decision makers who could possibly support upscaling in future projects the relevant people were involved. So experiences gained in the process of Sonnenfelsplatz further enriched the political mindset of participation in Graz.

4.6. Concluding remarks

Having a look at selected participatory (mobility) projects, Graz can built upon several experiences of citizen involvement. Indeed, the city government committed themselves to actively include stakeholders in important decision-making processes, which led to the development of guidelines for

citizen participation (see Chapter 4.1). They define rules for the city on how to communicate and carry out participatory projects. Importantly, the guidelines do not permit people to put new projects on the agenda and initiate participation directly, but they are a tool to claim for participation in envisaged projects which the city eventually can accept. The guidelines can be considered the outcome of a successful institutional upscaling process in the last years. After a testing phase from 2015 to 2016 the guidelines are in place and – as one important outcome – triggered awareness for smart governance being an ongoing process that needs constant improvement. From the perspective of the city of Graz the aim is to further institutionalize participatory processes, especially the way how they can be demanded and initiated. There is a trend to open up governance structures, which might increase the number of projects involving citizens in the future.

A crucial factor for success is the cooperation between the city government and important divisions such as the city's Directorate for Urban Planning, Development and Construction, and the Directorate for Citizen Participation. Close contact between the key actors and their involvement attached to clearly defined responsibilities in projects are pre-requisites for institutional upscaling, as well as upscaling in the sense of transferring results from one project or area to another.

While the guidelines for citizen participation support the starting of participatory processes, every project eventually depends on an appropriate individual setup and design in order to be successful. This in particular concerns the selection of methods, e.g. which stakeholders are asked to participate and how, who coordinates and moderates the project or single events (external vs. internal moderators), how are activities communicated to the public etc.

As has been identified in the area of Griesplatz, there are several circumstances that can indicate advanced challenges for the setup of a participatory process in terms of social inclusion: high unemployment rate, low educational level, high crime rate, bad living conditions, a lot of people dependent on social care, ethnical unbalance, environmental constraints, lack of infrastructural facilities.

One common mistake, which also happened in Graz, is to raise wrong (too high) expectations among citizens in the forefront of participation processes (constraint #5, see Table 6). It has to be defined explicitly what is open for discussion (creative freedom) and what is not. Not keeping promises does harm to the concrete project but also worsens the climate for future participatory actions as we could observe it at Griesplatz. Once a participation process is running, the organizers have to take care that people exchange their ideas only in these guided settings (according to the chosen method) and avoid that sub-groups organize parallel events themselves (constraint #13, see Table 6). This can lead to misunderstandings if people interact among independent groups that are not coordinated by the city and are not part of the actual participatory decision-making process.

In general, it is important to distinguish between *process satisfaction* and *result satisfaction*. The focus of the organizers (the city) has to be on a fair, socially inclusive procedure, while the outcomes are second. It has to be clear, that results of participatory decisions neither necessarily need to please all stakeholders nor everybody directly involved in the decision-making. They cannot solve differences in opinions or conflicts of interests, however, a result achieved on a participatory basis will receive better acceptance than a top-down order. From the Graz experience it seems that once these facts are clear to key-actors the fear against involving citizens diminishes and courage to let people talk pays off at the end.

5. Maastricht

5.1. Governance context in Maastricht

In the Netherlands, municipal governments consist of three organs: the city council as highest organ (with its size depending on the number of inhabitants); the board of mayor and aldermen; and, thirdly, the apparatus of civil servants. The city council of Maastricht has 39 seats. Its task is to provide clear policy frameworks and to control; the council can dismiss an alderman.

Dutch municipalities have two faces: *self-governance* (mainly task of the council) and *co-governance* (executing federal policy, municipality as face of the national government, mainly task of the board). Provinces, as intermediate between federal and municipal level, have an important coordinating task regarding spatial planning and public transport, but within the municipal borders, municipalities have a fairly high level of autonomy to go their own way.

The role of the mayor is mostly that of manager of the municipal governance apparatus and as symbolic figure, whereas the aldermen hold power over their domains, especially because between aldermen and their respective portfolio rules a "non-intervention-principle".

Maastricht has ca. 1,500 civil servants (including the workers on the street). Their work is presided by three directors who come together in the team of directors. The city council in Maastricht meets every two weeks. In 2015, as part of the newly installed coalition, the way of working has changed quite a bit. The first 1.5 hours (“stadsronde”) of each meeting are now public and open for everyone with a formal right to inform and ask the city council about important matters. In this time slot, discussions on specific topics are scheduled. The open and deliberative character of the “stadsuur” goes far beyond the “right to voice” (“inspraak”) resulting from a previous wave of democratization of urban governance allowing citizens to inquire.

Since WWII, urban governance in the Netherlands has come to include more participatory forms throughout various waves of innovation. The “right to voice” was the first step to open a previously isolated city council to the citizens. In the 1990s, “interactive governance” was the result of a new wave of governance innovation including citizens and other “stakeholders” in the process of policy-making. More recently, a number of reports by governmental advice offices have pushed this involvement to the level of implementation and propose a “Do-democracy” or “government participation” (Raad Openbaar Bestuur 2012; Sociaal Cultureel Planbureau 2012).

In Maastricht already from the 1970s onwards, large area developments were executed in collaboration with big private players: Public-Private-Partnerships (PPP's). In the case of Maastricht this was above all with the ING Bank and Bouwinvest (a pension fund for construction workers), backed by a relatively stable share of the municipality. To capture their top-down character, these PPP's are sometimes described as “cockpits” from which huge infrastructural projects were planned, implemented and overseen.

Ultimately since the 2008 financial crisis, this model stopped functioning: private partners are less willing (or even unable) to invest in real estate. Core partners, such as the housing corporations, are forced to focus on core activities. The political representation in the city council is also much more fragmented and unstable. This provided a first incentive for the city to look for more small-scale and decentralized forms of governance and co-creation. The Maastricht-LAB, but also the “Maastricht Energy Agreement” are part of a broader shift towards social coalition formation through “mini-PPPs”.

Over the last decade, the city council agreed a number of policy visions that were developed through interaction with citizens: the city vision 2030 (in 2005 and updated in 2008), the structure vision (in 2012) and the economic vision 2020. Earlier, in the 1990s, the "neighborhood-approach" ("wijkaanpak") as a tailored plan to improve dialogue with local residents had been implemented, including neighborhood platforms as self-organized representation of practically each neighborhood of Maastricht.

Whereas front-running civil servants try to enlarge its support base, this participatory way of working in coalitions meets some resistance within the municipal apparatus. Not everyone wants to become a facilitator of complex co-creation processes, and the "old" top-down rule-and-control approach is still a viable one for many tasks and problems, even according to the frontrunners of the "new" way.

Finally, Maastricht is also embedded in national (e.g. the Association of Dutch Municipalities), and nowadays more and more in European and other international city networks. Besides, EU directives on urban issues can have an impact on urban governance, such as the Air Quality Directive.

5.2. Selection of case studies

The case studies selected for the retrospective analysis in Maastricht include (1) a pilot from electric bus mobility, and (2) the building of a P+R facility connected to a new train station. The first can be seen a successful case of upscaling, the second not (for the moment). Both are projects initiated and executed top-town by experts with hardly any stakeholder participation in the development phase, but a fair amount in the implementation phase. The analysis is based on a combination of official documentations produced by the involved institutions and interviews with representatives of those institutions or other stakeholders (see References).

5.3. Case 1: Zero Emission Bus project

Recently a pilot project with electric bus mobility was organized in Maastricht in the form of one electric bus serving one particular line (for about a year, March 2015 – summer 2016)[7], referred to as the Zero Emission Bus (ZEB) transportation project. More than only a test of technical functioning of an electric bus, the project aimed at learning how the electric bus would fit the schedule of operation of Veolia, the public transport operator. This relates to the question to what extent the schedule would need to be adapted in the shift from diesel to electric because of shorter range of the latter, how many extra buses would be needed, when and where recharging would be most economical, what the new recharging infrastructure would look like, and what that would mean in terms of overall operational and infrastructural cost (and who would need to bear these). Also, it included the question what the implications would be for the way a tender is currently set out by the provincial government to find a public transport operator (previously done every 10 years). And finally it addressed the question how zero emission and low noise levels of the electric bus are appreciated by the citizens, passengers, etc. on the street and in the bus.

- **Overcoming resistance to innovation and innovation achieved**

The pilot-project was part of a multi-stakeholder initiative that includes a vision (formulated in 2012) to shift to electric bus mobility by 2025 in the southern provinces of the Netherlands (Limburg and

[7] The VDL Citea Electric bus used in the pilot project was funded with an ELENA grant from the EU.

Noord-Branbant). After the pilot-project, the parties agreed that by 2019, there are supposed to be 30 to 35 ZEB in Maastricht and by 2025, whereas the Province of Limburg intends to have a total number of 250 ZEB in operation. Although only numbers of buses are mentioned as (upscaling) target, it implies that electric bus mobility increasingly becomes integrated in the public transport operations. The key stakeholders in the pilot-project were the municipal and provincial government (the latter being the concession provider of public transportation in the whole of Limburg), the former and successive public transport operators (Veolia and Arriva) and a bus manufacturer (VDL).

What were constraints on upscaling? The three types of stakeholders involved in ZEB together had a wide variety of concerns considering the feasibility of upscaling electric bus mobility. First, there are financial-economic constraints. All interviewed stakeholders (see References) agreed that the main challenge to upscaling is a financial one: electric buses are more expensive to purchase (about twice the price of diesels) and investments in a new recharging infrastructure are necessary. The representative of the municipality expressed the concern that if extra cost would be transferred to higher ticket prices, this would discourage urban public transportation. The municipality argued that the 'other parties' should bear the extra cost. Operator and manufacturer agreed with this, but argued that the government as concession provider should increase the value of emission reduction compared to price stability and punctuality. This relates to the second constraint: concession constraints. All three interviewees representing public transport operators showed considerable concern in relation to the uncertainty, duration and flexibility of the concessions. The financial investments are considerable and rather risky in light of the fact that concessions are generally covering a span of 10 years. Secondly, the tight and inflexible performance requirement of concessions (including penalty mechanisms in case of delays) are not helpful for the introduction of a new technology which implies uncertainties in driving and charging times. For the province, however, tight performance requirements cannot be compromised (because passengers demand flawless services, they argue). These are political trade-offs. These uncertainties relate to another constraint: technological uncertainties. The shorter range of the electric buses obviously has an impact on the bus timetables, but it is unclear to what extent. How will the batteries operate in the more hilly areas, what about the available power to make a detour in case of road closures? Also, current time tables are so optimized that there is no time for hours of recharging. Other, more secondary, technical uncertainties relate to maintenance and life time of the batteries. Operator and manufacturer did not agree on who should bear the risk of these. Fourth and finally, there are constraints on available public space for recharging infrastructure. The municipality raised questions regarding "what additional structures we need in the city, what is the effect of that supplemental structure on the quality of public space". Should it be one larger charging station or various smaller charging points?

- **Lessons learned**

Did the project leadership anticipate upscaling of the innovation and how? Yes, because the project in Maastricht was part of a (broader) multi-stakeholder initiative that includes a vision to shift to electric bus mobility by 2025[8], all of the constraints on upscaling discussed above were explicitly addressed and discussed to anticipate and explore possible solutions. This resulted in the following lessons learned about upscaling electric bus mobility at the urban and regional level, per stakeholder:

[8] The initiative also included authorities and operators in the province of Brabant. Although all parties had signed the vision (see below), for transport operators the actual commitment to the vision would depend on profitability issues (Source: 'off-the-record' interview with transport operator).

- Concessions are the real trigger for the Province of Limburg to think about how to make a full-fledged ZEB plan become reality (interview with province).
- Concession period should be lengthened to (at least) 15 years instead of 10 years (which was the length of the previous concession). This could bring the cost of electric bus mobility towards the level of diesel bus mobility (interview Veolia).
- The bus operator needs some extra buses that can be used when electric buses are recharging or experience other problems (interview Veolia).
- Arriva stressed the importance of cooperation and mutual support between the private and public sector: "At this moment, we need each other" (interview Arriva).
- Veolia learned from cooperation with others within the initiative: It is helpful because it gathers all stakeholders together to obtain and share experience of this rising business, instead of conducting separate projects. Veolia's representative claimed that "you need all kinds of parties in the discussion. And every party is really concerned. That is why a zero emission bus foundation was very helpful as a sort of mediator to get all parties together and then go on with the discussion. And at the end we all sit together to get experience on this business model. Instead of that, everybody is starting with 'I only want to get involved if I get my cost [s back]'." (interview Veolia).
- A technical lesson learned was that it is very important that "our bus can drive with one battery for more than 300 km or more than 350 km" (interview Veolia).
- VDL, the e-bus manufacturer, expressed that they "obtained useful experience while working together on the ZEB project", which helps to better estimate the risks of electric bus mobility. "If you know something is not a risk, then you don't need to price it. You're cheaper than your competitor" (interview: VDL). There were no specific lessons mentioned.
- The municipality learned that they would like more studies on air quality improvement of electric bus mobility (interview Municipality).

The project leadership (i.e. the board of the foundation ZEB) was especially interested in the development of a more integrative 'Total Cost of Ownership' (TCO) model, which combined the business models and roles of the various stakeholders to focus on the societal cost/revenue structure of electric bus mobility. This has been delivered. The TCO-model is available via a free web-application for stakeholders in the Public Transport-chain, supported through the (established) mobility knowledge platform CROW. So although the ZEB will be discontinued as an initiative, the availability of the findings is secured.

- **Co-design, openness, reflexivity and public value creation**

The process that led to the public-private coalition (in the form of a foundation for 'Zero Emission Bus transport') was unique in the sense that previously these parties would have a more distant or even competitive relation to each other (because of performance contracts or competition in tenders). This time they joined an open dialogue on what would be needed to achieve a socio-technical change to electric bus mobility, what each partner would need to change to make this happen, and what they would need to learn. The members of the coalition would need to share the knowledge obtained, whilst accepting a small investment and risk of failure.

The foundation was set up at a regional level, with connections to the ministry and especially two provinces, which teamed up with the large transport operators (in that area) and the (only) Dutch

electric bus manufacturer. Together these parties set up two local experiments, one in Eindhoven and one in Maastricht. Lessons learned at the local level were shared with the regional level (i.e. the level of two provinces).

The ZEB initiative was mainly executed by the three key stakeholders (authorities, public transport operators and manufacturer), but in a steering group included a broader set of representatives from 'knowledge, financial and branch organizations', although it was not transparent how they were chosen. The local project in Maastricht mainly was a collaboration between the three types of stakeholders mentioned above (i.e. bus operators, manufacturer and authorities). Only through a student project in spring 2016 a broader group of (about 150) citizens and travelers was interviewed about their experiences.

The public interest during the local experiment was (only) secured through the participation of the urban and provincial government. Nevertheless, in the broader ZEB foundation a broader group of NGO's participated. Overall, it seems that the risk of social exclusion was fairly well covered through the broader group at the regional level and the local and provincial government at the experiment level. For instance, the local government stressed that the cost for the traveler should not increase because of the new electric propulsion.

5.4. Case 2: Station Maastricht-Noord with P+R facility

Around 2000, the Province of Limburg started to develop new train stations in South-Limburg as part of a broader strategy to encourage train mobility and stop declining numbers of passengers. This plan included a new train station at the North side of Maastricht. When talks with Gemeente Maastricht began around 2005, the latter suggested developing the plan in the context of the projected traffic development in the city (i.e. autonomous growth of a few percent a year and especially the risk of congestion from the building of a new tunnel in Maastricht, during its construction). This collaboration led to the plan of a train station just north of Maastricht (more north than originally planned), close to a (newly planned) highway exit, in combination with a P+R facility. For the Gemeente Maastricht this plan fitted well in the transport policy goal to promote alternatives to the car (policy note 'Op weg naar een duurzame bereikbaarheid', 2006). The (financial) responsibilities of station versus P+R were split: the cost of building the train station was for the Provincie Limburg, while Gemeente Maastricht was responsible for building and spatial management of P+R area, including the management of the train station. The Province of Limburg had arranged that trains would stop four times an hour: twice by the regional operator and twice by the national operator NS. The building started early 2011, the station and P+R opened by November 2013.

- **Overcoming resistance to innovation and innovation achieved**

Differently respect to the original plan, in the year before the opening the national train operator withdrew its commitment and would not stop its trains at that station (because of limited expected travelers). The resulting frequency of two trains an hour were deemed too low for an attractive P+R offer (interview Maastricht Bereikbaar), and indeed, initially the station and P+R facility with 360 parking spaces was hardly used. Maastricht Bereikbaar suggested to implement a bus line with two stops an hour, and asked Veolia (the regional PT operator, both bus and train) to develop options including cost implications. All parties were hesitant to spend more money on this, so the cheapest option was chosen: a separate bus shuttle to the city center (unconnected to regional bus schedule)

only operating on selected peak days (four times an hour). Maastricht Bereikbaar financed the shuttle with the Gemeente Maastricht for a pilot period of a year (2014), Veolia operated at cost price. Maastricht Bereikbaar also led the marketing- and communication campaign (as part of a broader set of behavioral measures to promote alternatives to cars in Maastricht), and arranged the parking + bus/train ticket price at a very attractive 1 euro per day per car (including all passengers). On peak days the P+R was used well by visitors of the city. At the end of the one-year pilot, Maastricht Bereikbaar suggested to target commuters (in addition to visitors) and to introduce the bus shuttle on weekdays until 7 pm. After talks with the Province of Limburg (which is the concession provider of regional PT operations), Veolia accepted and from 2015 onward the bus became part of the regional schedule of Veolia (daily, four times/hour, until 7 pm). The fee became 1 euro per day per person (instead of per car). On weekdays, the P+R is now used by about 200 commuters, and is full in the weekends and Thursday evenings (with visitors).

- **Lessons learned**

What the upscaling process consists of in this case is not straightforward. Most of the interviewees thought of upscaling in terms of growth of the number of users of this particular P+R/station site. The project shows a successful anticipation to problems that were encountered in terms of usage of the (parking) capacity. In addition, the spatial design of the site has anticipated an expansion of the number of parking spaces (currently 360) to up to 1,000, with a first extension planned for 2017. However, this process is not an example of upscaling in the sense of new meso-structures and practices at the level of Maastricht. In the overall mobility practices of Maastricht the 200-300 P+R users are fairly negligible without a subsequent expansion of intermodal trips and P+R infrastructure. Such an upscaling strategy was not anticipated during the development of P+R Noord. The municipal policy aim was to prevent growth of car use on the city rings ('singels' and bridges) and associated congestion. There is no policy aim to decrease car movements there. The current policy is to 'let the traveler choose', and offer both high quality parking and public transport for an accessible Maastricht (i.e. with little congestion). In other words, the development of P+R Noord has not entailed any notable change in parking policy practices at the city level. There have been some parking policy changes (i.e. the introduction of a 'ring model' with parking fees increasing toward the city center), but these were to prevent congestion not to decrease car use in an absolute sense. Nevertheless, P+R Noord seems to have structurally changed the commuter behavior of about 200-300 people.

Which factors constrained this broader upscaling process? The key constraints on upscaling in the sense of expanding intermodal trips and decreasing car use, were: (1) there was and is no political will/support to the goal of decreasing car use in the city center in an absolute sense (e.g. from a 'quality of the city environment' perspective) and replacing car use by intermodal travelling. Moreover: (2) a private party (Q-park) has invested in a number of large parking garages and their continued operation has been guaranteed for a certain period (at least until 2030); there are contractual commitments between the city government and Q-park (the parking operator).

Although there were some measures to anticipate upscaling, namely measures to stimulate P+R Noord and to make car-alternatives more attractive in general (i.e. 'carrot' measures), there was no policy aim (nor any measures) to decrease car use in the city, only to prevent growth (i.e. no 'stick' measures) and no strategy to increase the number of P+R sites (only to increase the number of Park+Walk sites, much closer to the city center).

- **Co-design, openness, reflexivity and public value creation**

The collaboration of Gemeente Maastricht with the province, later partly through Maastricht Bereikbaar, increased the leverage of the Gemeente Maastricht towards Veolia, since the province is the concession provider of all public transport in the region. Within the public-private partnership Maastricht Bereibaar, a diverse group of stakeholders, there was a clear agreement on the desirability of this particular P+R and the need to make it a success (although not as a strategy to develop more of these and reduce car use in the city center).

A further upscaling process of inter-modal travelling in Maastricht seems especially attractive to the residents and organizations of the city center, so this group could be a driving force of the upscaling process. These were however not (particularly) involved (although some employees reside in the city center).

Maastricht Bereikbaar is a public-private partnership, so composed of a diverse group of stakeholders: employers/businesses and local and provincial governments. In the planning (location) and development of the station and P+R site, there were no additional groups, such as nearby living citizens (districts of Limmel and Nazareth) or workers in Beatrixhaven involved (also, residents of the city center, who could benefit, in terms of air quality and space for walking & cycling, from an upscaling of inter-modality, were not involved). Also, the initial target group ('visitors') was not questioned upfront. However, as soon as the P+R started, there was continuous monitoring (including questionnaires) of the users. The project helped to create a cheap parking option, so benefitted lower-income car drivers, and also nearby living train users (who do not seem to be so many). There is no worsening of conditions outside the project.

The planning and development of the station & P+R site was mostly done by planning experts of the province and the municipality. After 2010 the public-private Maastricht Bereikbaar was founded and joined the development of the operational strategy and behavioral measures. This meant that large employers in the city became involved in the discussion (with meetings three times a year). Since the involved organizations make up a significant share of the commuting traffic, this was an effective way of learning about the perspectives of the organizations and also of reaching the commuters (namely through their employer). This has likely stimulated the use of the P+R site (and effectiveness of additional behavioral measures to stimulate car alternatives). Since the decisions taken by Maastricht Bereikbaar needed to be agreed by the partners and by the city council, it also increased the legitimacy of the project.

It is unclear what the impacts of not involving citizens or other organizations than the Maastricht Bereikbaar partners (in a direct sense) are, and of the planning and development process (before 2011) only being done by planning experts of the province and municipality. The interviewee of the municipality mentioned that it would have been difficult to ask the right questions to citizens, 'because we were ourselves still unsure about many things'. Nevertheless, involving residents and organizations of the city center might have been a driving force of the upscaling process of intermodality, since inter-modal travelling in Maastricht seems especially attractive to them. They were however not (particularly) involved (only through some employees residing in the city center).

5.5. Concluding remarks

Recalling the discussion on socio-technical regimes and obduracy (in WP2), we find various elements of this helpful to understand the two retrospective example cases. In the first case, electric bus mobility,

we found that there are various interconnected constraints on upscaling, reflecting the obduracy of the 'urban assemblage' (constraint #7, see Table 6: Types of constraints on upscaling and social inclusion in Living Labs and ways to anticipate them). Key actors such as the province and the public transport companies had different views on the risks involved in investing in an electric bus system. The province demanded a flawless service for bus passengers, and considered the electric bus as a challenge in that respect. Private parties such as the public transport companies were initially put off by the financial risks of the electric bus system. These opposing views and priorities could easily have resulted in a complicated and slow negotiation process and could have limited the chances of successful upscaling. Nevertheless, the stakeholders were put together in one coalition and they addressed and negotiated all relevant doubts and concerns. They managed to overcome the differences in view points and developed a shared vision of electric bus mobility that highlighted their common interest.

In the second case (P+R), upscaling had not been considered explicitly in the planning of the experiment, mainly because there was only political support for one facility, but not for a strategy to remove parking spots from the city center towards a growing number of P+R sites (constraint #5, see Table 6). Stakeholders then just think of it as one project. Second, there is a legal or infrastructural 'lock-in' in the established practice (i.e. 'car parking in city center'), especially regarding parking operation contracts or concessions in underground garages, which have a duration of more than 15 years. These can be seen as a strong glue that hold the pieces of the urban (car) mobility regime together, resisting change of the whole socio-technical 'ensemble', and only allowing a separate 'add-on' (constraint type #7, see Table 6).

Third, for anticipating upscaling, we can observe that much of the success of local experiments depends not only on local upscaling, but also on more transversal and translocal types of knowledge transfer. As has been investigated most extensively by geographers, local actors can 'jump scales' and create spaces of engagement that shifts the local power balance in favor of the local experiment at the expense of vested interests. Our analysis in the example case of electric bus mobility also suggests that an effective strategy to anticipate upscaling can be for actors to convince actors at higher geographical or governance levels to team-up with them, since we saw the local government effectively teaming up with the provincial authority.

Finally, we can recognize a wait-and-see attitude in case 2 (constraint #4, see Table 6), with no strategic discussion about more P+R sites at the border of the city taking place during the project, despite strong anticipation at the level of the particular P+R Noord (to use available capacity and even increase parking spaces).

In terms of social exclusion, we found that policymakers in Maastricht typically believe that interactions with stakeholders add much complexity to the policy development process and accordingly have a preference of working with experts only (and not with citizens or civil society organizations), especially in the first phase when they are not sure themselves of what they want. This may explain why the P+R site was initially not well used (constraints #1 & #8, see Table 6).

6. Conclusion

In Chapters 2-5 we learned about local specificities concerning social exclusion and upscaling from past experiences with innovation projects in the four cities of Bellinzona, Brussels, Graz and Maastricht taking into account their local governance structure. Despite the differences in governance and the variety of local challenges, our retrospective analyses allow us to draw general conclusions in relation to our focus issues. The following section incl. Table 6 connects the retrospective analysis to the findings from the literature review in WP2 (D2.1 & 2.2) and summarizes what we learned about social inclusion and upscaling in Living Labs both in terms of constraints and possible solutions.

In each city we found a tendency of the local government to rely on (professional) experts rather than include a broad range of citizens or civil society organizations (constraints #1, #8, #9, see Table 6). This was especially true for the more strategic phases of a project. Brussels' ExpAir 2.0 project showed a good example of anticipating this constraint by pro-actively engaging a broad variety of stakeholders, through the collaboration of the civil society organizations. To a large extent it may not be negative experiences but rather the "fear of the unknown" that prevents politicians and decision-makers from choosing a participatory approach. City governments opt for "traditional" solutions, relying more on experts, because involving citizens is seen as "adding complexity". Such aversion of policymakers to interference of stakeholders in their policy development or decision-making process correlates with unfamiliarity of modern methods/practices of co-design (constraint #6). In addition, applying modern methods of participation is not yet common knowledge and/or practice in many cities. This can, amongst other reasons, be attached to older, conservative people filling out important positions. With more open-minded decision-makers entering in city governments this could change. The Ricicletta case (see Chapter 2.3) shows how the will and courage of single persons can make the difference when it comes to the question of involving citizens or not.
Professional planning and appropriate selection of participatory methods are crucial to an urban experiment (constraints #11, #12, #13). Some cases prove that when the process of involving citizens in decision-making is well planned all concerned parties can be satisfied (e.g. at Sonnenfelsplatz, see Chapter 4.5). Especially, a visioning process (even if the process allows different accents of actors) can be instrumental to increase the experience of the urban space as a common space (constraint #5, recognized in the E-bus case, see Chapter 5.3).
To escape the trap of resistance to participation and lower the barrier for initiating participatory projects, some cities established binding rules for their city government (e.g. guidelines for citizen participation in Graz, see Chapter 4.1). This on the one hand gives citizens more power to initiate participation processes and on the other hand provides a tool for politicians who can rely on an approved method.

Upscaling

In order to trigger durable change at the urban level, the impact of a Living Lab project needs to go beyond the level of a building, a street or small district. It should be scaled up to the level of the socio-technical system (i.e. city or urban region) in order to shape new (and expanding) meso-level structures. Sometimes upscaling Living Lab projects does not happen because it was not planned and contemplated in the first place (constraint #4). Also, most of our analyzed projects showed conflicting

Table 6: Types of constraints on upscaling and social inclusion in Living Labs and ways to anticipate them

		Typical constraints in Living Labs	Ways to anticipate constraints in Living Labs
Upscaling – related to Living Lab	#1	**Limited representativeness of LL[8]** *Design, conditions and results of pilot projects are of only limited applicability to new projects. Generated knowledge is very much related to the context of the LL only. Resulting limited potential to apply the results of the pilot projects to a larger scale.*	• Design pilots in a way that they can result in transferable outcomes • Include future users[8] • Include diverse groups of relevant stakeholders
	#2	**Limited learning[8]** *No explicit monitoring of lessons learned in the pilot. Lack of comprehensive knowledge – no single actor has an overview of all options, mechanisms and impacts. Hence no transfer of learnings to future users.*	• Develop explicit learning strategy[8] including both single- and double loop learning[9]
	#3	**Poor timing[8]** *Conditions change during the course of the LL so that by the time the pilot is finished, the policy climate no longer supports the adoption of the innovation. This is also reflected in a lack of urgency to change existing practices.*	• Maintain flexibility in the pilot so that it can be adjusted to developments that may arise[8]
	#4	**Wait-and-see attitude[8]** *LL is run as a routine project with no special strategy dedicated to diffusion of results during and after the pilot. Either upscaling effects are expected to occur by themselves or strategies to enhance the diffusion of knowledge and learning are put into place after the pilot ended.*	• Include upscaling strategy at beginning of LL project[8]
Upscaling – related to context	#5	**The outcomes of the LL do not find consensus beyond LL participants[10]** *Not enough support or no political majority for LL results. Decision makers are not familiar with or open to methodology of co-design approaches.*	• Develop vision in participatory way (emphasizing 'the common')[11] • Make explicit what is contextual and what is not
	#6	**Lack of institutionalization of the LL results[8] and fragmented institutional arrangements with expert-driven way of thinking and powerful lobbies[12, 13]** *Lacking cooperation between different parties involved (e.g. city departments) and no clear distribution of responsibility. Decision makers are not familiar with or open to methodology of co-design approaches.*	• Foster transparency and collaboration between administrative units • Include future users/relevant stakeholders (incl. policymakers) • Carry out multiple (successful) pilots to convince urban planners (and other future users) • Include citizen participation in city policy (e.g. guidelines)
	#7	**'Sticky' urban assemblage (infrastructural/ technical, legal, financial, spatial, social etc.)[12]** *Obduracy of urban assemblage; e.g. persisting infrastructure, long-term contracts, legal 'lock-ins'.*	• Scale jumping of local actors[13] • Develop vision in participatory way (emphasizing 'the common')[11] • Focus on behavioral measures that trigger structural change[14]

Social Inclusion	**#8**	**Rely on (professional) experts in decisive moments** *Aversion of interactions with stakeholders that might add complexity to the policy development process. Hence, too little interaction between decision makers and stakeholders.*	• Include future users[8] and diverse groups of relevant stakeholders • Give voice and responsibility to professional experts, citizens and civil society organizations
	#9	**Reproducing existing power structure inside of LL (exclusion *in* the lab)** *LL setup and applied methods are not neutral and unbiased. Marginalized groups are not sufficiently included or their opinions are not taken into consideration seriously.*	• Assess existing power structure (stakeholder analysis) and identify coping strategies • Include diverse groups of relevant stakeholders incl. marginalized groups • Apply inclusive participatory methods in LL
	#10	**Neglecting effects outside project locality** *Due to focus on LL, effects on its boundaries or neighboring areas might be neglected or forgotten (e.g. decrease of cars in one district shifts traffic to other).*	• Consider cross-scale effects (situation analysis)
	#11	**Limited inclusion of target groups and/or marginalized citizen groups (exclusion *from* the lab)[8]** *Too little attention to needs of marginalized groups, already in the setup of the LL. No appropriate selection of methods to foster broad participation.*	• Include diverse groups of relevant stakeholders incl. marginalized groups • Include future users[8] • Requirements analysis • Cooperation with NGOs and citizen groups
	#12	**No proper distribution of information about LL activities** *Information is not provided appropriately to reach all stakeholder groups. This concerns media releases timely enough, in clear language (incl. translations), via various channels and multiplicators etc.*	• Follow dissemination and communication strategy tailored to specific goals and local conditions (time, channels, language etc.)
	#13	**Uneven or biased 'playing field' of LL events** *LL does not have full support of city government or is only alibi activity. Decision makers are not present at LL events or do not show real commitment. Methods are not tailored to all LL participants.*	• Apply suitable methods tailored to specific goals and target groups • Ensure unbiased and neutral locations (e.g. accessible to everybody) and facilitators • Demonstrate real commitment by LL organizers

Sources: Retrospective cases as presented in D3.1; Additional literature: [8] Vreugdenhil et al. 2010; [9] Brown et al. 2003; [10] Hommels 2005; [11] Dellenbaugh et al. 2015; [12] Banister et al. 2011; [13] Smith 1996; [14] Schwanen et al. 2012

views on the outcomes of the innovation project or pilot, with some powerful actor or a political majority opposing further upscaling (constraint #5). Upscaling can mean different goals in that respect, ranging from multiplying devices or concepts (e.g. ExpAir 2.0, see Chapter 3.5) to governance-oriented institutional embedding of methodologies (e.g. guidelines for citizen participation in Graz, see Chapter 4.1). What we can learn from the presented cases is that a particular upscaling strategy should be considered already when setting up a Living Lab, including defining commitment of relevant stakeholders. We believe that in any case new (especially 'smart') mobility practices go hand-in-hand with new governance practices.

Living Labs around the world partly deal with the same issues and come up with solutions for them. While it is tempting to assume that such solutions are easily transferable/scalable to other cities or projects this is not how reality works. What in theory could fit, often lacks the connection to the local

context and people who understand how to embrace it. In addition to developing new ideas, Living Labs can serve as a tool to further articulate existing ones and convince people of solutions that were created elsewhere before (e.g. shared spaces, roundabouts etc.). That means that participants do not need to invent something completely new but they help to pave the way for a promising concept (e.g. shared space at Sonnenfelsplatz, see Chapter 4.5).

One pitfall to realizing participatory projects, in addition to decision-makers' choices, are infrastructural or legal 'lock-ins' (constraint #7). This means that long-term contracts (e.g. concessions) do not permit any change in a socio-technical system. If this problem can be resolved at all, it can only happen via bringing together stakeholders to negotiate a solution for a certain project (e.g. supported by a shared vision as in Maastricht, see Chapter 5.3). A general recommendation on how to manage upscaling in such cases seems difficult.

Social inclusion

Practitioners in city development contexts often repeat the same message: Local residents know their neighborhood better than outsiders. While this does not mean to put power completely in their hands it surely needs city decision-makers to listen to them and foster a knowledge exchange – at eye level. Ideally civil servants would go out in the streets and talk to people – an experience that can be enriching but rarely happens (constraints #8, #9, #11). NGOs and citizen groups can play an important role to bridge this gap (e.g. BRAL in Brussels, see Chapter 3.5). They are "closer to the people" and usually have a more direct, trustful way of communicating with the local stakeholders, especially with minorities. However, one has to be aware that also these groups are not immune to unwanted selection of people involved (constraint #11). It is the responsibility of city governments to recognize the value of these associations and attribute the right role to them by supporting them in terms of time and money (e.g. sub-contracting in Living Labs). At the same time the city has to maintain an active position in the participatory process, avoiding the impression of "outsourcing" participation into a Living Lab (constraint #13).

Exclusion can happen in different ways: there are mechanisms that prevent people from participating in a project (exclusion *from* the project, e.g. due to limited time resources; constraints #11, #12) as well as other mechanisms that prevent participants from contributing fully to the discussions (exclusion *in* the project, e.g. due to uncomfortable atmosphere in meetings; constraints #9, #13). Organizers should take into account both when designing a Living Lab. This can imply timely information, financial compensation for participation in meetings, or providing translators and independent facilitators/moderators.

The cases presented in this analysis do not always fulfil the criteria of a Living Lab. Social inclusion was usually not defined as priority which often resulted only in low levels of participation as according to the model of Arnstein (1969): information was distributed but co-design hardly took place (e.g. Pollution Peak Emergency Plan in Brussels, see Chapter 3.3). Hence, it is even more important to plan future projects differently, as Living Labs with a concrete strategy designed for different target groups to achieve social inclusion.

These findings from the retrospective cases and the literature review of WP2, help us to identify the particular constraints to social inclusion and upscaling in the Living Lab experiments in WP4, and, moreover, to anticipate these as good as possible during the design of these projects.

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