

# Co-creation of Local Mobility Solutions: Lessons from the Mobility Lab in Hamburg-Altona

K. Tatum<sup>1</sup>(<sup>[]</sup>), T. Cekic<sup>2</sup>, A. Landwehr<sup>1</sup>, J. Noennig<sup>1</sup>, J. Knieling<sup>1</sup>, and B. Schroeter<sup>1</sup>

<sup>1</sup> HafenCity University-Hamburg, Überseeallee 16, 20457 Hamburg, Germany {kimberly.tatum,andre.landwehr,joerg.noennig,joerg.knieling, benedikt.schroeter}@hcu-hamburg.de <sup>2</sup> Humboldt University-Berlin, Ziegelstr. 13C Room 311, 10117 Berlin, Germany inalcekt@hu-berlin.de

**Abstract.** The Altona Mobility Lab, part of the EU project "Cities-4-People" funded by Horizon 2020, seeks to implement locally developed mobility solutions through a dedicated co-creative approach. The Lab demonstrates the process of community building, ideation, and implementation for user-centric mobility solutions and provides an example of co-creation in implementation of neighborhood-level mobility solutions. This paper addresses key considerations of public participation and provides a model for considering challenges faced and addressed by Urban Living Labs. The analysis of the Altona Mobility Lab process demonstrates the potential successes and obstacles for the Living Lab method for the participative development of user-centric sustainable mobility solutions.

**Keywords:** Urban Living Lab · Urban Mobility · Co-creation · User-centric mobility solutions · Citizen empowerment · Cities-4-People

## 1 Introduction

A significant shift in the concept of participation and governance in recent decades has resulted in an increased focus on learning and social innovation and reduced emphasis on expert dominance. Especially since the 1990s, new forms of public-private partnerships and networks have been promoted to tackle social exclusion in participatory practice. One popular form of civic engagement is citizen-centered co-creation in so-called 'Urban Living Lab's (ULL). ULLs as a method and an arena for innovation have potential for new forms of collaboration among multiple actors, as has been seen in several implementations of the Living Lab method [1–4].

However, the success of this type of co-creation to contribute to participatory urban development, especially with mobility related issues, remains to be explored. Transportation is cited as one of the most complex policy domains regarding the participatory decision-making processes [5, 6]. A shift to more sustainable mobility requires fundamental changes by planners and service providers, as well as by users. The contributions of the ULL method to user-centric mobility solutions are considered here through the example of the Cities-4-People Mobility Lab in Hamburg Altona (an EU Horizon

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2020 project). We first discuss the rise of the Living Lab method as tool for more citizen-empowered participatory planning. Drawing on the literature on participatory governance and co-creation, we identify four basic factors of participation and connect ULL goals and methodologies to these guidelines. Analysis of the Altona Mobility Lab shows the potentials and challenges for ULLs to engage citizens and their contribution to a self-organization and civic-initiated action for mobility.

## 2 Participatory Aspects of Urban Living Labs

Living Labs, defined by Dell'Era and Landoni as "a design research methodology aimed at co-creating innovation through the involvement of aware users in a real-life setting," were first used for product-testing (digital and technological) and was then adopted by researchers [7–9]. In recent years, the Living Lab concept has also been adopted in urban planning and transportation planning efforts [3, 7]. Thus, the Urban Living Lab has been developed as a platform for interactive and innovative local participatory planning and implementation, often with purposes related to sustainability and livability solutions [3, 10, 11].

The rise of the ULL method has happened in the context of urban planning's increasing focus on more empowering and inclusive participation processes. There is substantial literature on public participation and participatory planning with a focus on engagement of individuals and/or communities with local institutions and political structures [12, 13]. Broad benefits of participatory planning have been identified, as summarized by Mahjabeen, et al. and Brodie, Cowling and Nissen: (i) furthered legitimization and accountability of democratic institutions (ii) improved social integrity (iii) increased efficiency of public services (iv) empowerment of individuals [12, 14].

Assessments of many participation efforts, however, show a need for improved collaboration among diverse stakeholders, rather than the more traditional formats [9, 15, 16]. These methods, such as public forums and hearings, maintain the static roles of citizens as sources of opinions and feedback and experts as final decision-makers [9, 17], despite increasing recognition of citizens' desire to get more involved in planning processes [17].

Power inequalities are also present in participatory processes, as has been much debated in both policy documents and scholarly discussion [18–21]. Arnstein's "Ladder of Participation" is prominent in the literature, emphasizing complexities and contradictions of public involvement and inherent power relations. Several studies classify the participatory mechanisms and approaches departing from Arnstein's ladder. They provide a framework for the depth of public participation, based on the role and level of agency available to actors in the participatory process. Thus, level of participation can be categorized and chosen depending on process goals: Inform, Consult, Involve, Collaborate, and Empower [22–24].

The unique characteristics and format of the ULL concept are related to co-design and co-creation of solutions and implementations. This process of experimentation allows room to fail, and exchange among multiple and interdisciplinary stakeholders, which can be seen as a response to power relations and a potential tool to confront them. ULLs are seen as a potential vehicle for lasting changes to governance forms and practice in urban planning [10, 25].

On the other hand, the complexity of participation has unfolded a discourse on the assessment of participatory processes within different policy contexts [22, 26–29]. Smith and McDonough, for example paid particular attention to the question of how citizens described their experiences with and attitudes toward different types of public participation [26]. Bickerstaff et al., focused on four key principles of public participation in the process of local transport planning [22]. We adopt these four principles, (i) inclusivity, (ii) transparency, (iii) interactivity and (iv) continuity, first to explain the linkages of the ULL concept to participatory planning and, subsequently, to assess the Altona Mobility Lab's progress towards truly user-centric mobility solutions with reference to the unique aspects of Urban Living Labs.

#### 2.1 Inclusivity

In the urban context, ULLs form a space in which community members, including stakeholders and experts, come together to develop and experiment with solutions for their problems [9, 30]. This aligns as well with the characteristic of "openness" of Labs as defined by Ståhlbröst [31]. Friedrich et al. suggest that everyone who is interested or affected by a decision should have the possibility to get involved and get access to information [32, 33]. At the same time, fair representation of the user groups must be ensured, avoiding active participants' voices covering marginalized or underrepresented opinions [8].

ULLs are located in the community, where the interaction takes place in a neutral environment, not owned by any of the involved stakeholders if possible [8]. In this space, diverse stakeholders can interact in a less hierarchical manner in which commentary and experiences from citizens are valued alongside input from experts. Members are considered as co-creators, not only serving as informants but also shaping outcomes by contributing their local knowledge and expertise. These multiple actors are supposed to be engaged in creating a shared vision [9].

With this emphasis on user involvement, ULLs often also face practical challenges involving citizens and relevant stakeholders. According to Habibipour, one of the main challenges of ULLs is coping with multi-organizational collaboration between a variety of stakeholders including public, industrial and academic actors [3, 34] which have become the focus of collaboration with the concept of "Quadruple Helix" referring to public–private–people–partnership [7, 8].

#### 2.2 Transparency

Building trust and operational transparency is a necessity. Juujärvi and Lund point out that ULLs are not entirely free from external governance structures; instead, they combine a bottom-up and top-down approach which encourages creativity but must account for existing governance structures and potential for action [9]. These structures and limitations, as well as the expressed goals of the Lab, must be clear for all participants if they are to work together.

Aichholzer and Allhutter call attention to the necessity of transparent communication of results, interim and final, as well as negotiation and decision-making practices in the realm of online participation [35]. These suggestions are also highly relevant for ULLs,

which due to their nature have the potential to develop a mindset or character which is opaque to the uninitiated. While there is some suggestion that new members may disrupt Lab functions [36], inclusivity demands general acceptance of all. Yet external communication can also be a challenge, as participants weigh the need for discretion related to discussions inside the Lab [34].

#### 2.3 Interactivity

Buhr et al. highlight that user involvement in ULLs exceeds common dialogue forms and that "municipalities involved...had to challenge and expand their idea of co-creation into something more extensive"; noting also that public organizations must also be collaborative across internal divisions [37]. ULLs are purpose-driven, that is to say they are focused on problem-solving rather than commentary or discussion, and work to respond to the needs of stakeholders directly [8, 9]. In doing this, the focus is on innovation and experimentation, providing an opportunity to try out solution ideas [9, 17].

In this collaborative format, stakeholders are asked to take on roles different from their habitual ones. Members of the planning administration, for example, must get involved in ideation and development with citizens and private groups, rather than only accepting feedback or tailored bids [8, 25]. Organizational expertise and a range of creative, hands-on methods, such as Crazy 8s or Storyboarding, draw these different groups into active co-creation in ULLs by forcing all to step out of their comfort zones.

## 2.4 Continuity

ULLs are concerned also with procedural change, not only single-project successes. Franz et al. suggest timelines of "four to seven years" to ensure that Lab results flow into larger planning projects [8]. It is also important to note that the ULL concept itself, through the interactive process, forms a learning experience for participants, which can be transferred into other facets of their work or local activities over time [32].

Ownership arises with the issue of extended duration of ULLs. A management role has been argued to be vital, but there are associated challenges: flexibility for all actors must be maintained and one group should not be given sole power to direct actions [3]. It is therefore considered important to involve citizens as early as possible and already in the design phase of the project in order to identify their needs and to ensure a common goal and vision among all stakeholders.

## **3** Description of Altona Mobility Lab

The Altona Mobility Lab in Hamburg was launched as part of the EU project "Cities-4-People" (C4P) funded by the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 723194. C4P implements pilot programs in five urban areas throughout Europe in which citizens, city authorities, and innovation experts work together to define their transport and mobility challenges and priorities,

co-design ideas and concepts, put these concepts to the real test and then scale up successful projects. The project thus proposes a user-centric model for cities facing mobility challenges via People Oriented Transport Mobility (POTM), by bringing together municipality, research institutions, transport authorities and citizens. Five Urban Mobility Labs were launched simultaneously in Oxfordshire (UK), Budapest (HU), Trikala (GR), İstanbul (TR) and Hamburg (DE).

The Lab was organized in Hamburg-Altona by the District of Altona and HafenCity University (HCU). The experiences of the Waag Society, a C4P partner, with the Smart Citizen Lab for open data physicalization in Amsterdam shaped the process. With this guidance, the Altona Lab was considered a conceptual space: in multiple places, with multiple people, developed over time. This paper reports on the first of two rounds of the Lab, conducted from late 2017 through early 2019, which co-created solutions to be piloted in spring and summer 2019.

First interviews and a survey in the community shaped the purpose and initial focus of the Lab around the central neighborhoods of the District of Altona. The mobility challenges center around the train station, which serves the area with regional and suburban trains as well as acting as a bus transfer point. The station and train tracks also divide the surrounding neighborhoods, forcing cross-town traffic onto narrow streets through dense, historic areas. The district continues to grow in population, leading to further conflicts between all road users (Fig. 1).



Fig. 1. Aerial view of Altona station and train tracks (Landesbetrieb Geoinformation und Vermessung Freie und Hansestadt Hamburg. 2018. Digitales Orthophoto (DOP20) Früjhjahrsbe-Fliegung)

Several phases were initially identified in which specific Lab goals would be reached: defining challenges, building community, ideation and concept development, concept selection, and pilot development. Events and actions (i.e. survey, voting) were planned over the first participation phase, focusing on identification and discussion of local

mobility challenges and subsequent co-creation of solutions. Methods and levels of engagement at these activities were designed to increase in intensity organically, moving from stakeholder recruitment through the decision-making process (Fig. 2). The goal of facilitating co-creative work was present in the planning of each activity.



\*Newsletter excluded from timeline as it was on-going throughout

Fig. 2. Timeline of Altona Lab activities and participation level

The Altona Mobility Lab co-defined 3 key challenges for local mobility: conflicts regarding the use of space by different modes of transport, missing infrastructure for bike traffic, and insufficient accessibility for disabled people. Based on these challenges, the Lab developed ideas for mitigation over the summer of 2018. In particular, space-related conflicts between transport modes inspired Lab members to argue for temporary banning of cars from selected streets. Using the Lab as a starting point the idea was taken up by local politicians and activists. Parts of the project area are now being considered as a test-bed for car-free neighborhoods, and this planning is being informed by the Lab method.

Further ideas for mobility improvements underwent a co-creation and selection process inside the Lab, to manifest in three pilot projects: replacement of car parking spots with bike parking facilities, micro-depot for neighborhood-level logistics and sharing information campaign. For instance, the replacement of public car-parking spots with bike-parking facilities was a response to the challenges of conflict-of-use and missing bike-infrastructure. During Lab events and activities, the value and significance of bike parking was discussed. To develop a pilot concept, the Reverse Brainstorming method was used to create criteria for new bike parking sites. An online mapping tool was then distributed among Lab participants and online, allowing all to suggest new sites for bike

parking and to specify which criteria were met there. The resulting list of potential sites was examined according to these criteria in the District of Altona and a selection for new bike parking was made from these sites. Signs at the new bike racks will inform about the development process.

## 4 Stakeholder Involvement

Our analysis of this first round of the project considers the level of participation actually met by the activities offered. Activities at the consultation level made up nearly half of Altona Mobility Lab content. It is important to note that the lower number of activities at the informing level is because the majority of Lab activities were intended to do more than inform. At all events, a short informational input was given, which provided new Lab members background information on the Lab's purpose, timeline, and goals. Activities at higher participation levels predominated at the later stages of the Lab. In person as well as online activities, such as prioritizing and voting for the piloting options and siting input, were offered throughout the Lab duration.

The overarching goal of the Lab was to create a truly participatory environment, in which ideas for local mobility were co-creatively developed and co-decided. Considered overall, activities were offered which met this goal as they built upon and honored the results of early stages of the process, culminating in an open and transparent decision-making process. A closer examination by stakeholder category demonstrates, however, some challenges experienced in this process. Four categories of stakeholders are considered by virtue of the QHS model: government/administrative, industry/business, academic/research, and public. To further illuminate the Lab composition, we divide public stakeholders into civil society (i.e. representatives of initiatives, etc.) and citizens. In this constellation, the local citizens are those with the least power, therefore we consider it important to investigate to which extent they have been empowered in the Lab process. The Lab organizers, C4P project team from HafenCity University and the District of Altona, are considered here equal actors in the Lab and representatives of their groups. In all activities they participated in the co-creative methods with their own input and cannot be seen as neutral facilitators of the process.

Lab events and activities were promoted publically, with press releases and direct invitations through mailing lists and social media, as well as flyers posted in the local community. As shown in Fig. 3, when all activities are considered, the share of participation by citizens is quite high. Online participation strongly supported this outcome. For example, in the co-produce stage there were 93 participants in the online discussion and voting; and in the co-decide stage 209 people participated in bike rack siting. The stakeholder category of online participants was not collected for data protection reasons. Online participation was targeted regarding personal opinions, though, so online participants can be considered taking on the citizens' role - as there was not a possibility to represent oneself in a professional capacity in the online participation. This high online activity is a positive result and implies that the high levels of interest in online political engagement may extend to more involved co-creative actions. Interaction with the Lab newsletter corroborates this. As newsletter recipients were offered opportunities to take part in online Lab activities, rather than only information about upcoming or past

in-person activities, their level of interaction increased as measured both by number of opens and number of clicks.



Fig. 3. Percent of attendees in each category, by participation level

From Fig. 3, however, it can be seen that the share of citizen participation especially at co-producing and co-deciding events is substantially reduced when online activities are not considered. The shares of participation from the categories academic, industry, and civil society remained relatively low but constant, while the share of government/authority participants increased with engagement intensity. The overall number of participants at in person activities also decreased as the participation level of the activity increased. Lowest in number but most consistent is the academic category, represented mostly by Lab organizers from HCU. Similar total numbers of members of business and civil society were engaged in the process, though participation from both groups decreased as the project reached more advanced stages. Citizen involvement at in person events was highest at the lower levels of participation, averaging about 33 people per event in the consult stage, but decreased at higher levels of participation, to seven in the co-decide stage.

This shift in the Lab composition can also be seen through the most represented group at events under each level of participation. At events with lower participation levels, citizens made up the majority of Lab actors. At events with higher participation levels, the

majority was made up by the government/authority. Considering the interaction and participation of the stakeholder groups overall, the public and government/authority groups were the most engaged groups. The Lab experienced challenges keeping a consistent number of participants at events as level of participation increased. Also, the composition of these later events shifted to heavily favor government over other groups.

These changes in participation level mirror the reduction in breadth of ideas and potential solutions under discussion. As the Lab events transitioned in purpose to selecting and further defining concepts, many proposed ideas from previous rounds were left behind. At a dedicated Hackday, ideas were ranked by Lab participants on feasibility and importance of implementation in the project, for example, leading some more timeand resource-intensive ideas being dropped. These ideas were not lost, as they were communicated consistently into local planning processes (Altona Climate Concept, for example) and they remain open for further consideration in future incarnations of the Lab. Still, the narrowing of the Lab focus may have influenced participation, as certain stakeholders saw less priority to participate related to their less preferred ideas.

Factor	Challenges	Responses
Inclusivity	<b>Diversity:</b> Within stakeholder groups, varying depth of participation; Government stakeholders with varying topics of focus, citizens of diverse age, ability, and background, but less diverse business and academic members	<b>Participation:</b> Outreach to and involvement of all types of stakeholders at all events; Actions online and in person; Events covering range of times, days, and locations for best access
Transparency	Audience: Own communication channels available only to those already informed; Localized project efforts not often of relevance to city-wide media	<b>Communication</b> : Consistent updates on past and planned actions via website, newsletter, social media, and public media
	<b>Constraints:</b> Freedom of ideation impeded by complex collection of local planning projects and networks of mobility actors; Sense of outside factors limiting Lab possibilities (i.e. traffic laws)	<b>Process:</b> Repeated discussion of Lab goals and timeline, as well as constraints from timing, budget, and local context, so as not to induce unrealistic expectations
Interactivity	<b>Capacity:</b> More intense levels of participation required commitment of time and effort by Lab members both to attend events and to pursue implementation steps	<b>Methods:</b> Intentional mixing of stakeholder groups in varying discussion formats; Combination of online and offline comments and content
Continuity	<b>Consistency:</b> As direction of Lab action was chosen and became more concrete, some Lab members dropped out, likely as the chosen topics were less relevant or of a lower priority to them	<b>Ownership:</b> Recognition of Lab as community for mobility and identification with Lab increased over time; Government representatives and relevant citizens' initiatives were involved throughout
	<b>Duration:</b> The nature of the Lab as part of an EU project with concrete goals and end date leave the future of the Lab after project sunset in question	

Table 1. Assessment of Altona Mobility Lab

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Drawing on the Bickerstaff et al. [22] evaluation framework of public participation in local transport planning to assess public participation, the successes and challenges of the Altona Mobility Lab towards a truly participatory process are summarized in Table 1.

## 5 Discussion

Considering their appeal to reduce the power inequalities in public policy-making for sustainable mobility issues, ULLs are likely to become an indispensable part of participatory planning efforts. Regarding the lack of research dealing with the concept of ULLs, this paper extends the Bickerstaff et al. [22] evaluation framework of public participation in local transport planning to evaluate challenges and the responses in the Altona Mobility Lab and discuss its quality and impact in policy and decision making. This four-point framework provides a generalized assessment of the ULL method towards public participation goals. It does not, however, attempt a full assessment of all facets of ULL method, some of which exceed these participatory elements.

Challenges related to all four of Bickerstaff's factors were experienced in the Altona Lab, but in many cases the ULL approach could address these. Inclusivity and transparency challenges were counteracted especially well through the innovative Lab methods, including online outreach to increase diversity among stakeholders and clear and consistent communication with Lab participants. Communicating the limits of the process established trust among the community by reducing later disappointment.

Interactivity in participation was a challenge also addressed by the ULL format, though not completely solved. Numerical distribution from each category of stake-holder within the Lab interactions remained unequal, as has been seen in other Labs [10]. However, equal numerical representation doesn't always lead to a more balanced power relation. Public authorities' powerful role as ultimate decision-maker remains. On the one hand, representation of other groups in sufficient number for their opin-ion to be heard is essential. On the other, high government participation also reflects actors present from several departments and government institutions that have their own conflicts and challenges working together [37]. The Altona Mobility Lab provided a platform to bring all partners together. Innovative moderation methods clearly developed interactivity among the organizer authority and the community during the events as well as through online tools. In further development of ULL methodology, the possibilities and potential to more seamlessly combine in-person and online interaction and to offer these interactions at the same level of participation should be investigated.

Continuity remains the challenge of Altona Mobility Lab, which is based in the C4P project with a concrete end date. The structure of the project to produce solution outcomes pushes the focus onto results, rather than Lab processes, and increases the risk that the Altona Lab loses purpose after solution implementation. This risk can be seen already in the loss of some Lab participants as the concepts were developed and moved in a direction less relevant to their own interests. Others, however, maintained consistent participation: taking active part in events and online discussions. This implies an ownership feeling and identity with the Lab for those participants whose work or interests were aligned with the selected projects. Moving beyond co-created outcomes requires a long-term commitment to the ULL which remains in the same place after

the project period and acceptance of the ULL format as a process change rather than as a generator of a specific innovative idea. However, enhanced collaboration among the community and stakeholders might lead to a solution for the continuity of Altona Mobility Lab in space and time.

Overall, the Altona Lab has developed and is testing several user-centric mobility solutions which respond to the unique local context and expressed needs of a broad spectrum of stakeholders. Though interactivity and continuity of participation pose challenges for the ULL method, the concept of a Mobility Lab, as implemented in Altona, certainly provides a valuable tool in furthering the empowerment of citizens in local mobility.

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