

Co-creation of mobility hubs

Project deliverable D3.2

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List of abbreviations and acronyms

Acronym	Meaning
ASAP	As Soon As Possible
EC	European Commission
GA	Grant Agreement
KoM	Kick-off Meeting
KPI	Key Performance Indicator
LL	Living Lab
WP	Work Package
PT	Public Transport

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Project Executive Summary

The objective of the SUM project is to transform current mobility networks towards innovative and novel shared mobility systems (NSM) integrated with public transport (PT) in more than 15 European Cities by 2026, reaching 30 by 2030. Intermodality, interconnectivity, sustainability, safety, and resilience are at the core of this innovation. The outcomes of the project offer affordable and reliable solutions considering the needs of all stakeholders such as end users, private companies, public urban authorities.

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Deliverable executive summary

Key words

Co-creation, Co-design, Mobility hubs, living labs.

Summary

The SUM project intends to develop and implement solutions for an increased uptake of shared and active urban mobility. In the project one of the focus areas have been co-creation, i.e. how to involve citizens and other stake-holders in the development of the mobility system in a city. Although there are two deliverables on the issue of co-creation, this one focussing on co-creation of mobility hubs, all development of co-creation methodology has been done in parallel and there is significant overlap between mobility hub and street space design activities. The work has been carried out with the Fredrikstad LL acting as a test arena for the methodology and knowledge sharing with the other SUM living labs through online presentations, online and physical workshops, as well as physical support to the living labs that needed it. Co-creation has then been carried out in the living labs of Pentelli, Geneva, Krakow, and Coimbra. The results show that co-creation is a way to not only engage citizens, but to bring together professionals at the city, local business, and mobility providers to create solutions with high acceptance and high possibility of implementation. The work has been guided by the principle of fun, fostering engagement and continued participation.

Purpose of the deliverable

This deliverable reports on the Co-creation activities carried out within the SUM project and the development of the methodology to adapt it to the urban mobility context. Furthermore, it reports on the outcome of the activities and delivers a guide for those who want to co-create urban mobility solutions.

Attainment of the objectives and explanation of deviations

The objectives related to this deliverable have been achieved.

Intended audience

The target audience for this result is primarily practitioners and researchers wanting to understand the pre-requisites, methodology, and possible benefits and drawbacks of co-creation of urban mobility solutions.

Structure of the deliverable and links with other work packages/deliverables

The deliverable is reporting on the work carried out the different living labs to test and develop co-creation methods for designing mobility hubs. Closely related to this deliverable is the deliverable D3.1 that reports on Co-creation of street space. While there have been two separate work packages, the work is closely interconnected. The methodology has been developed in parallel and for some of the living labs where co-creation has been utilized, there has been elements of street space design and mobility hub design in the same activity.

1 Co-creation and Co-design

A fundamental start to a deliverable on the subject of Co-creation is to define what we mean by co-creation and how that relates to the concept of co-design. The two concepts are often used interchangeably and to get one common definition is probably impossible. A common way to define Co-creation is as any act of collective creativity, meaning creative processes that are shared by two or more people. According to Sanders and Stappers (2012), the concept is deliberately broad and today applies to most types of development activities. Within this broad umbrella, co-design can be understood as a specific instance of co-creation, referring to collective creative activity across the entire design and development process. In the context of the SUM project, co-creation serves as a guiding approach for developing mobility systems and services together with those who are directly affected by them, with the intention to work towards more of a co-design process.

Within SUM, co-creation is applied to a variety of mobility-related challenges and contexts. Examples include the co-creation of street space in Penteli, mobility hubs and street space in Coimbra, and mobility hubs in Fredrikstad and Geneva. Across these cases, co-creation is not limited to idea generation but is embedded throughout planning, development, and evaluation processes. The common denominator is the involvement of diverse stakeholders—citizens, municipalities, businesses, and researchers—who collectively shape solutions that respond to local needs and conditions.

1.1 Why Co-Creation?

Urban mobility is a highly complex system with a high number of stakeholders with diverse requirements. Examples are city planning departments, traffic planning departments, public transport operators, shared mobility operators, local businesses, and of course citizens (who are by themselves a diverse group with many conflicting requirements). All this, we argue, makes a great argument to pursue Co-creative design methods when designing new mobility solutions.

Co-creation is pursued because it leads to better and more robust solutions. By involving stakeholders early and continuously, solutions become partially pre-negotiated, reducing resistance during later stages of implementation. Furthermore, co-creation strengthens citizen engagement and trust, while uncovering insights that are difficult or impossible to access through traditional research and planning methods alone. These insights may relate to everyday experiences, tacit knowledge, or practical constraints that only emerge through direct interaction and dialogue.

1.2 Challenges in Co-Creation

Despite its benefits, co-creation also presents significant challenges. One major challenge is hierarchy. Power hierarchies (who makes the final decisions), knowledge hierarchies (who is perceived as an expert), and creativity hierarchies (who feels entitled to generate ideas) can all inhibit genuine participation. Participants may feel that sharing honest opinions or novel ideas is pointless if others ultimately decide, or they may hesitate due to a lack of formal expertise or design training. Even more crucial, to involve other stakeholders in the design process by

necessity will transfer some power from the city officials to other stakeholders, a process that may be challenging from many perspectives.

Another key challenge is engagement. While many citizens, users, and local businesses express interest in being involved, finding the time and motivation to participate is often difficult. Successful co-creation therefore requires active effort from organisers: invitations must be personalised, participation must be made meaningful, and activities must be engaging and even fun. Passive communication, such as announcements on a city website, is rarely sufficient on its own. In the SUM project the effort needed, but also the payback if you put in the effort was clearly demonstrated in the progression from very few participants in the first workshops to 49 participants in the last.

2 Activities

The work on co-creation has been organised in a process where the Fredrikstad Living lab has been the main partner to Chalmers for developing methodology and implement it in a city. The learning outcomes have been used to inspire the other living labs through webinars, presentations, and workshops. Chalmers has then supported with designing activities, and in the case of Coimbra also lead the actual workshop. The work package started month 6, which corresponds to the start of the year 2024.

2.1 Co-creation in Fredrikstad

A series of co-creative workshops have been conducted in Fredrikstad. The goal of the activities was to understand user needs and to create solutions that developed the new electric ferry (intended for autonomous operation) and its ferry stops into a mobility hub that would add value to the ferries and make shared and active mobility a more attractive proposition. As the activities in Fredrikstad was also intended as inspiration for the other living labs the results were communicated to the consortium at General Assemblies and in separate seminars.

The 1st workshop was conducted with representatives from Chalmers, Fredrikstad, HYKE, and the ferry operator 24 January 2024 to co-create a process for co-creation of ferry stops as mobility hubs? In the workshop we agreed on an area that would be meaningful for all partners to try to co-design solutions for. In this case the new HYKE ferry and its two ferry stops that could act like a mobility hub, connecting different modalities and providing a more convenient connection between home and works for people working in the industrial area of Øra.

The 2nd and 3rd workshop was designed to investigate user needs. Participating were representatives for the city, the ferry operator, HYKE (the builder of the new ferry) and citizens. The second workshop was conducted on a ferry, in an attempt to make the location act as a mediating tool, but due to the low number of participating citizens the third workshop was arranged at one of the companies located in the industrial area the ferry was supposed to

connect to. These workshops were conducted 29 April and 31 May 2024



Figure 1 Mapping with string, one of the co-creative methods used

In these two workshops the participants worked together to first describe their daily commute using pins and yarn on a map of Fredrikstad. They then made new routes on the map using the proposed ferry line. Based on these old and new routes they then discussed what the new route made them able to do, what they missed with the new route, parts of the trips that they thought to be enjoyable, parts they didn't like, and so forth. Examples of things that they liked to be able to avoid were congestion, and congestion charges. Things that they were concerned about was one particular road that felt unsafe as a cyclist. On the other hand, some parts of the new route was considered particularly beautiful and calming.

One major takeaway from the second and third workshops were that commutes also incorporate a lot of other activities, such as grocery shopping, picking up kids at school, etc. **The 4th workshop** was therefore designed to take the insights on citizen needs from the previous workshops and co-create new services that could be included in the ferry stops /mobility hubs. The workshop, lead by Chalmers, included representatives from a number of city functions (such as traffic & city planning, Business development, library) , local businesses (e.g. hotel, shoe maker, car rental), and citizens. In total 32 people participated in the workshop on 8 November 2024. In the workshop, the participants were divided into groups, all containing city representatives, citizens, and local businesses.

The workshop was divided into four sections. First, the outcome of the previous workshops was presented and the insight that by designing new services around mobility hubs, active and shared mobility could become more attractive, and at the same time stimulate local business. The participants were then divided into groups with representatives from citizens, city officials, and citizens and were tasked to work with different creativity methods to design new services. It's easy to design solutions that seems good on paper but, actually, doesn't work in real life. Therefore, the next part of the workshop the participants were asked to enact their new service and make a short video to show how the service works. This turned out to be very effective and engaging. The films were finally shown to all participants and everyone got to vote for their favourites.



Figure 3 An illustration of the videos done in the workshop

The final activity in the series was a **Webinar/Workshop** on key takeaways and next steps with all participants in the workshop series to make sure that all ideas and requirements had been captured, and to hand over ideas for implementation in the city. 29 October 2024, followed by interviews with key participants.



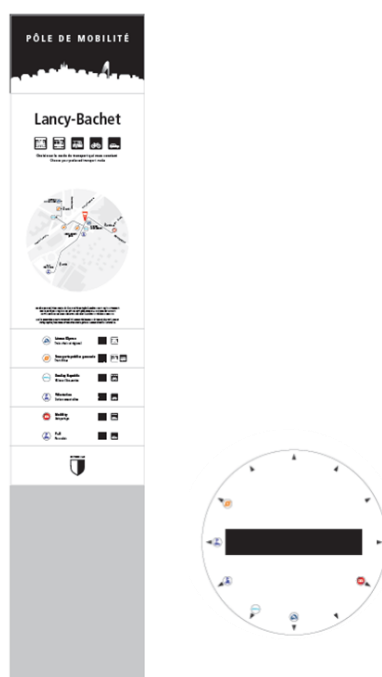
Figure 4 The co-design process in Fredrikstad

The result of the co-creative workshop series has been both related to co-creation as a tool in mobility design, but also a number of insights for the municipality, mutual learning between the stakeholders, and citizen engagement. Furthermore, the ideas for services connected to the ferry terminals to make new and active mobility more attractive have in some cases already been

implemented. For instance, a new feeder bus line and a shared bicycle station at Øra is already implemented.

2.2 Co-creation in other living labs

A goal of the project has been to inspire the living labs to try co-creating mobility solutions. In Geneva, one of the implemented measures has been mobility hubs. A key challenge for the hubs has been the number of involved entities; the city, the public transport operator, and operators of different kinds of shared mobility such as bike sharing, car sharing, etc. Thus co-creation has been one of the tools used, but not as much with users of the service, but with the different service providers and the city (Figure 5).



Mobility Hub totem

Figure 5 The mobility hub totem developed in Geneva

For Munich, Chalmers had two online workshops to design co-creation activities to solve the problem that many of Munich's mobility hubs is quite spread out over a large area, and that it thus can be difficult to find the modality that you are looking for. In the end, the time constraints of the project made the workshops not take place within the timeframe of the project.

2.3 Co-creative workshop on Co-creation

As described earlier, a goal for the WP3 was to (based on the experiences in Fredrikstad) inspire the Living Labs to carry out co-creation as a means to develop new mobility solutions. To reach this goal a workshop was designed for the Living labs to design co-creative design activities in their respective hometowns. Before the workshop, the Living labs had to decide on one particular spot to redesign and provide pictures and maps of the area. At the workshop the Living lab representatives were grouped with researchers and other project partners to co-create a co-creative workshop (Figure 6).



Figure 6 Co-creating co-creation

An important, if sometimes underestimated, aspect of co creation is creating a playful and inclusive atmosphere. The use of simple materials such as pins, yarn, and homemade emoji sticky notes helps reduce formality and encourages experimentation. Enjoyment and creativity are not distractions from serious outcomes; rather, they enable participants to engage more openly and contribute more fully.



Figure 7 The mobility co-creation menu, developed in SUM

One of the tools developed in SUM, specifically for the workshop but with the intention for it to be useful in the Living labs also after the project was a Co-creation methods menu (Figure 7). Keeping in the spirit of playfulness, the menu creates a structure for co-creation and suggests methods that are suitable for different phases of the co-creation process. The menu takes the form of a typical Italian restaurant menu, with the different courses representing different parts of a co-creation process from sensitising to idea generation to evaluation.

In general, we have aimed at providing materials made by us, both a means to make the workshop playful, but also to make it clear for the participants that effort has been made, an essential part to foster participant engagement (e.g. Gaver et.al 1999).

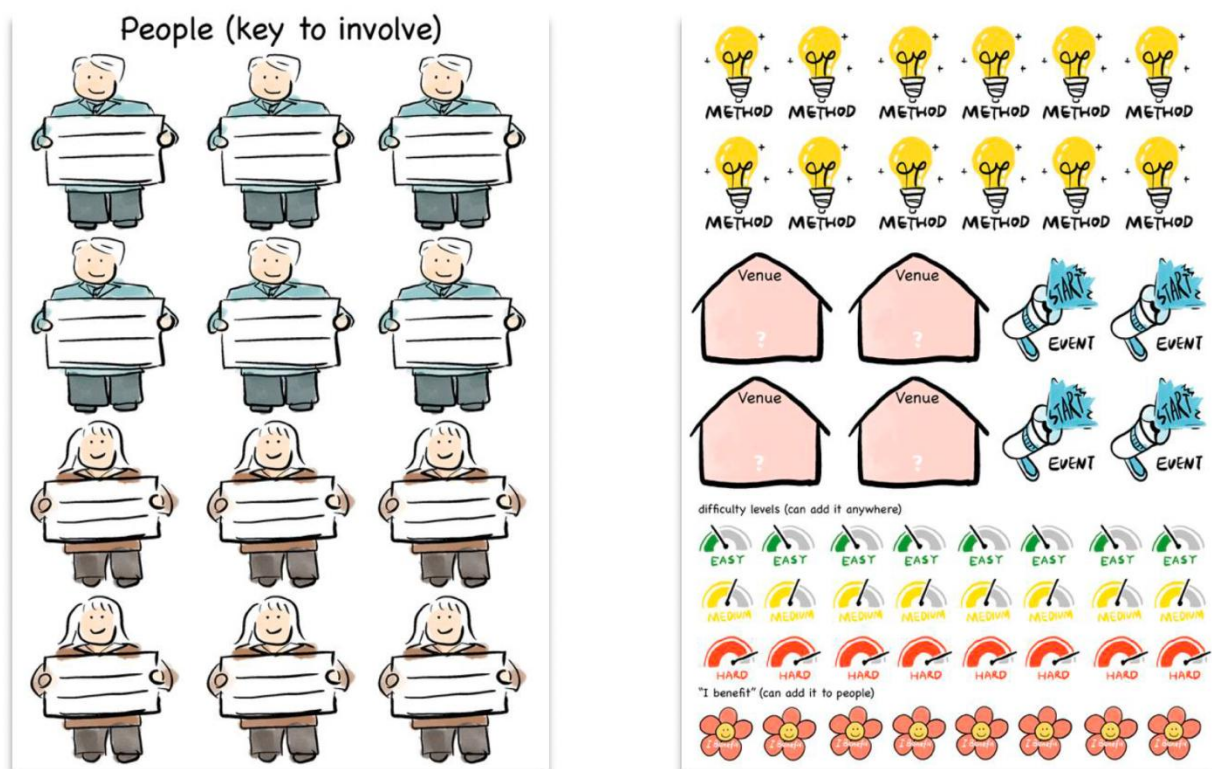


Figure 8 Workshop material, shows engagement and the commitment to fun

In addition to the Living labs learning co-creative methods for mobility services, one of the key results from the workshop were plans from all Living labs on possible co-creative workshops. What to do, who to include, what outcomes to expect, etc. Below the posters designed in the workshop gives some insights into what the Living Labs planned.

Fredrikstad (Figure 9), worked on the re-design of the Cicignion ferry terminal to make it more attractive and to use the space in a more effective way, for example by including more functionality in a similar way as in the previous workshops. Note that compared to the previous work, they added politicians as participants to ensure implementation, something that they had found out was a hindrance in the previous workshops when it came to implementation.

Fredrikstad - SUM General Assembly 2025

Co-Create your "Street Spaces Co-Creation Process"

1. Our Chosen Spot - Describe

Cicignon ferry stop. Only current facility is bike rack.
Growing interest in bike rental (electric) & 




thoughts

2. We want it to be...

Mobility Hub or other way to better use the space.

Write Here

3. Co-creation Outcome?

How to use the space better 

Write Here

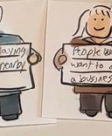
Our Co-Creation Process

4. Select People







5. Select Methods from the Menu

* consider one method from each course

Go there + Diary + Energy Boulder

Storyboard

In-place prototyping

Invite the public

Priority Vote  

 METHOD

Reflection Rounds

Document

Venue  

Link people, methods, events and venue!

6. if you have time...

- rethink participants
- sort methods into "Events"
- add "Venues" to events
- add "benefit" to participants
- add "easy/medium/hard" levels (anywhere)



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Figure 9 Fredrikstad designed a co-creation process for improving the Cicignon ferry terminal.

For the Geneva (Figure 10) group, the topic to work around was the design of a pick-up point for private car sharing. Local business like the nearby petrol station was considered key to include in order to get an attractive solution with acceptance from both users and local businesses that would be affected.

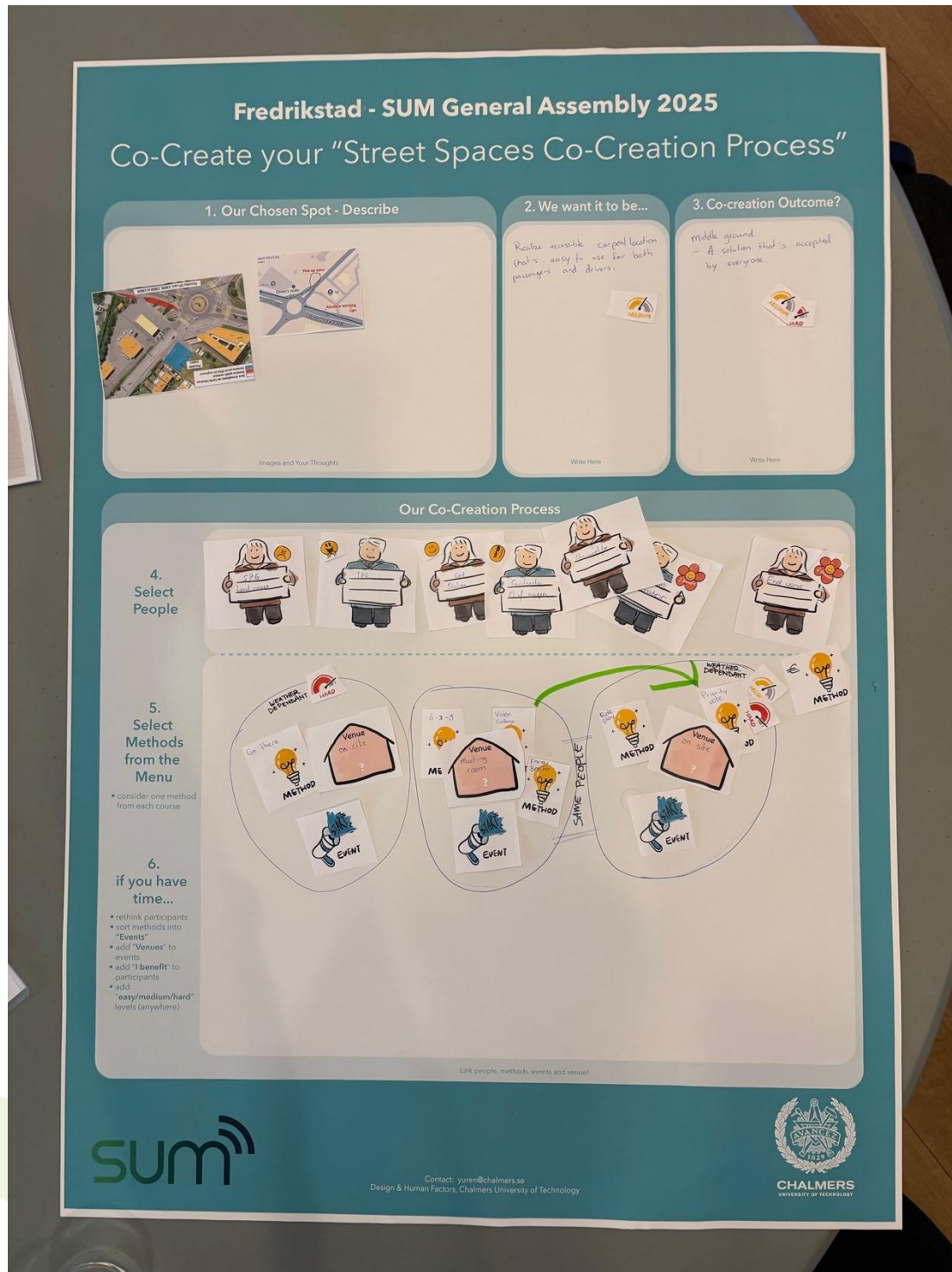


Figure 10 Geneva designed a co-design process with a number of stages for a new pick-up point for carsharing.

The group creating together with Krakow (Figure 11) works on the re-design of a large mobility hub outside the city center. Experienced safety was a focus as well as how to attract more user groups to the area. How to involve many different user groups to the co-creation workshop was thus a priority.

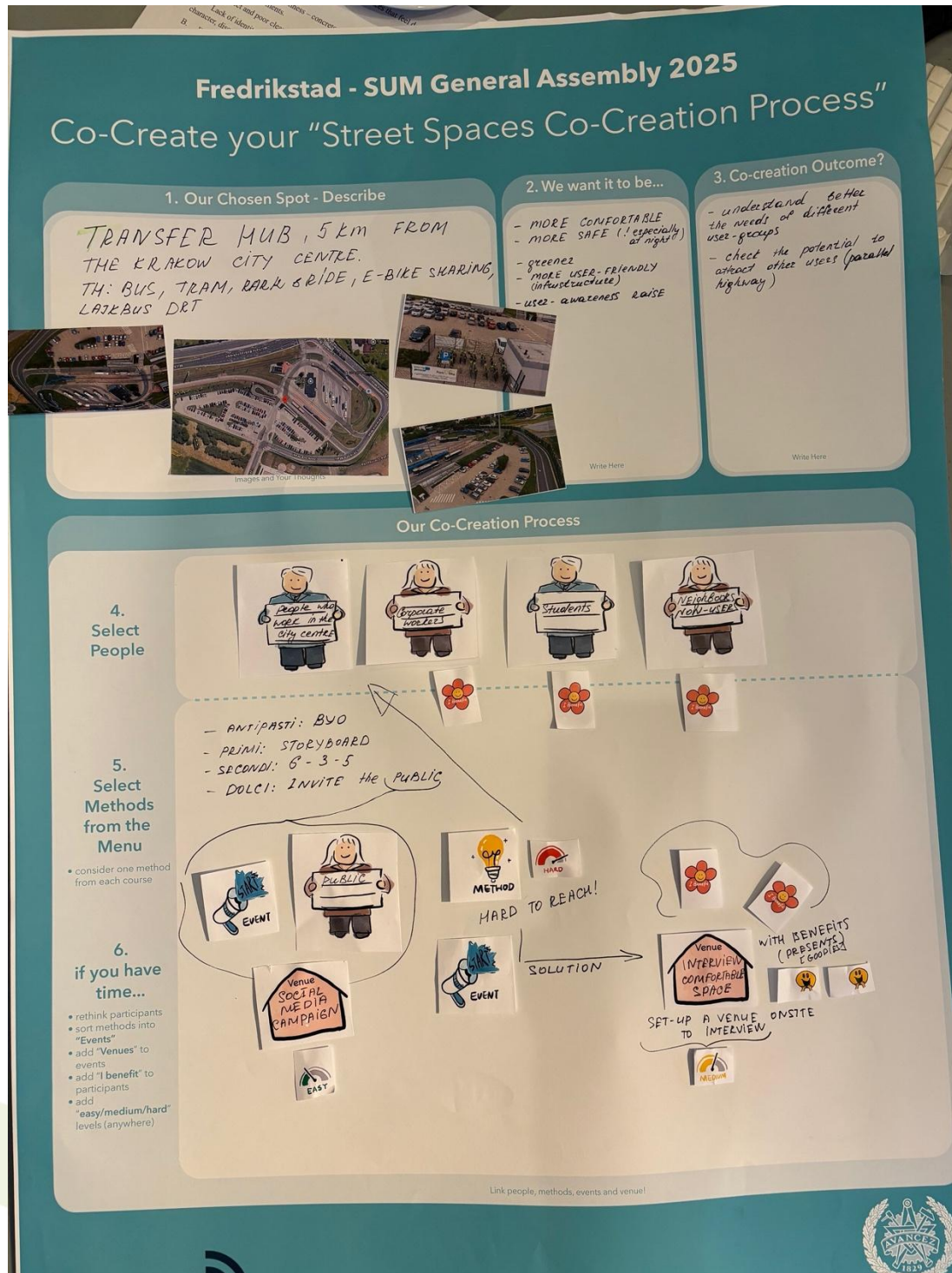


Figure 11 Krakow designed a co-creative workshop for a transfer hub outside the city centre.

The Munich group (Figure 12) Designed a full series of co-creative workshops for redesigning a city street to be car free and pedestrian focussed. They recognised that a city street have to cater for many interests and thus needed to include many different kinds of stakeholders

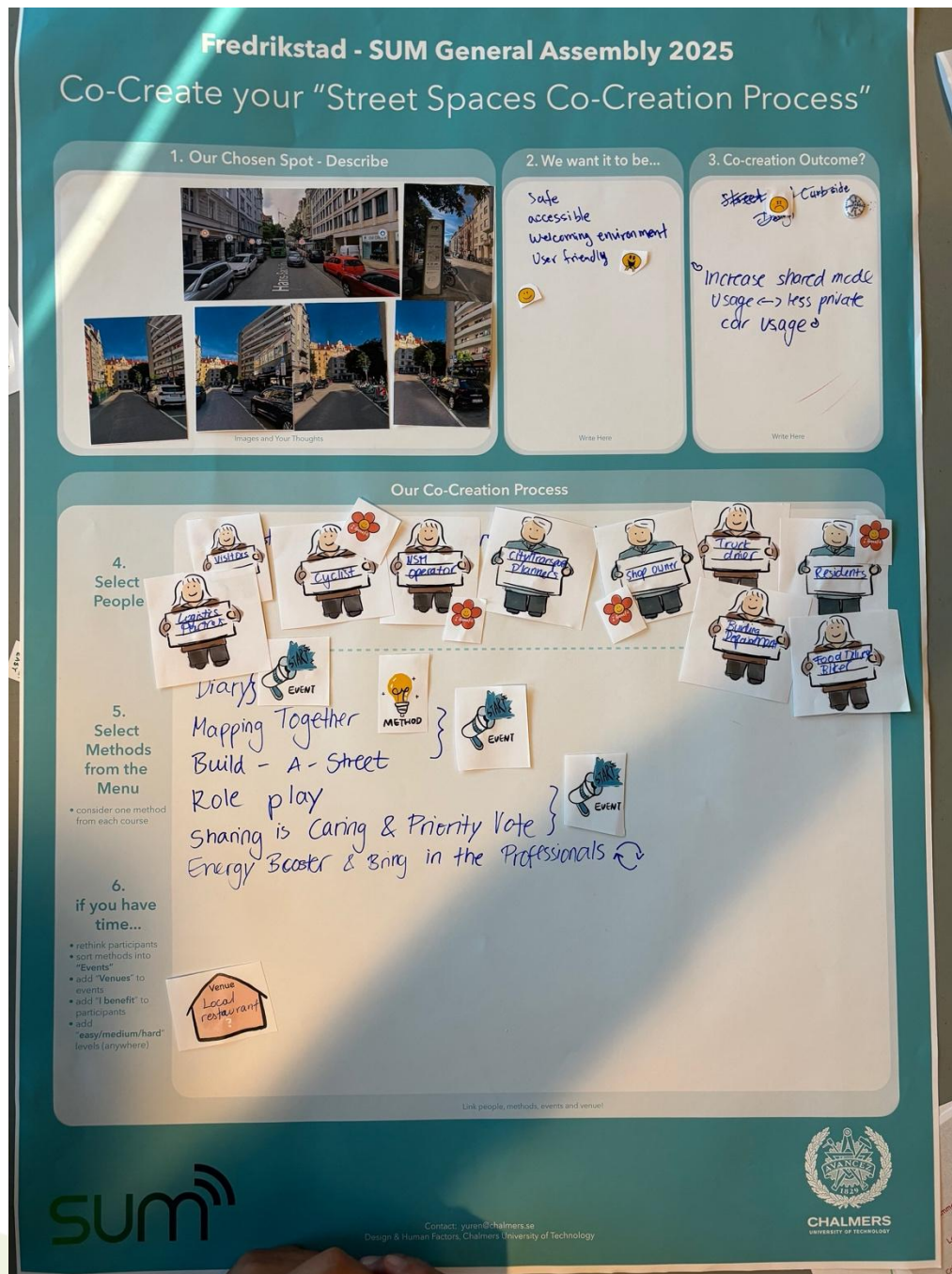


Figure 12 Munich designed a series of co-creative events to improve a street in the city centre and encourage shared and active mode.

Pentelli (Figure 13) continued on their journey to co-create better street space for shared and active mobility (See D3.1). In particular they focussed on a square that today is totally dominated by private cars. Based on their previous experience, their focus was on trying to get people to voice all their concerns and reach consensus.

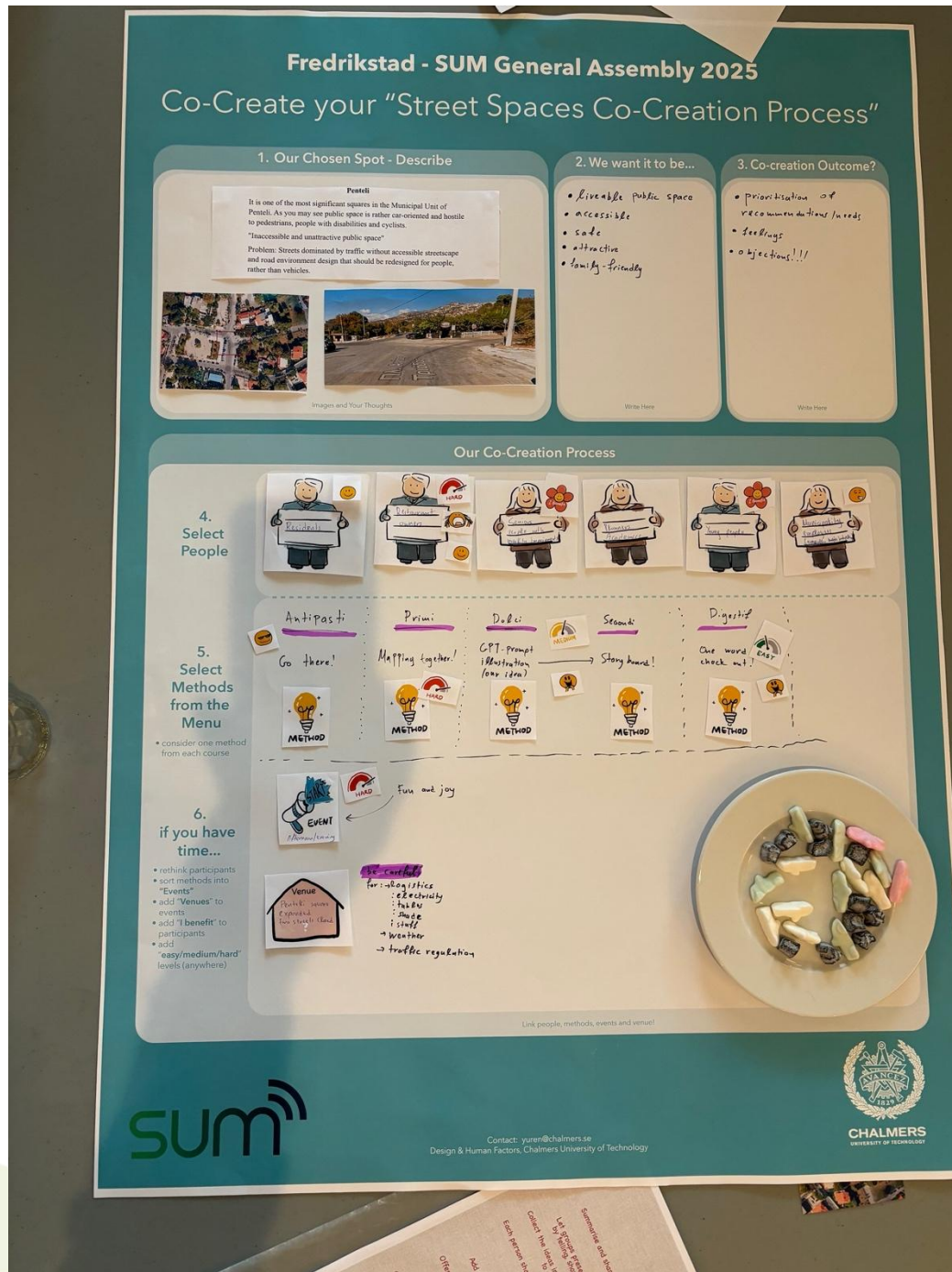
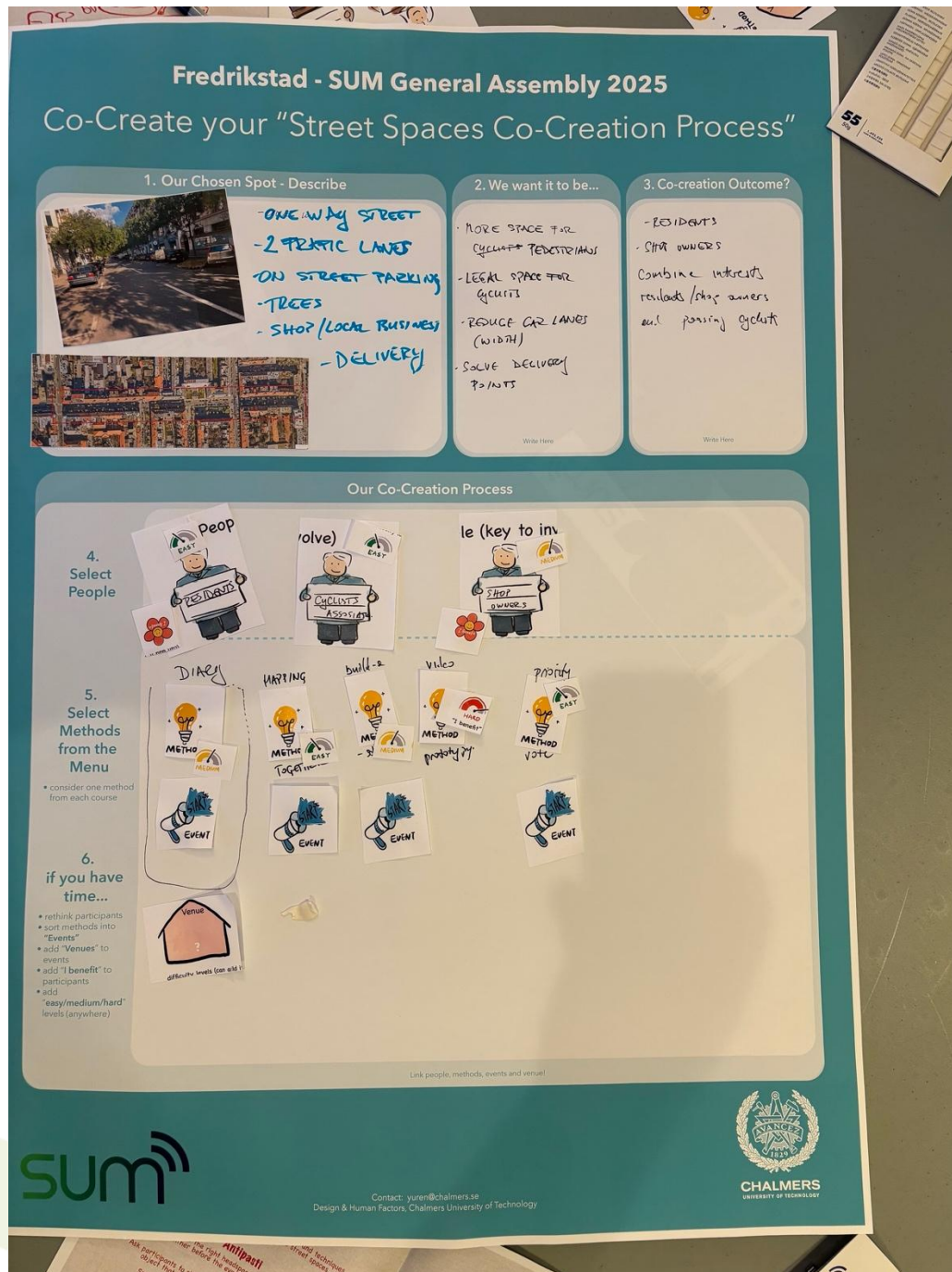


Figure 13 Pentelli designed a co-creative process for developing a square in the city, currently mainly occupied by cars.

Zagreb, one of the SUM project's follower cities worked on how to design co-creative sessions to work out the conflict between pedestrians, cyclists and shop owners when reducing accessibility for cars in a city street, see Figure 14. At the same time they also wanted to solve accessible and safe delivery points, a good example of the complexities of urban mobility where co-creation promises to be a useful tool.



Fredrikstad - SUM General Assembly 2025
Co-Create your "Street Spaces Co-Creation Process"

1. Our Chosen Spot - Describe

- ONE WAY STREET
- 2 TRAFFIC LANES
- ON STREET PARKING
- TREES
- SHOP/LOCAL BUSINESS
- DELIVERY

2. We want it to be...

- MORE SPACE FOR CYCLISTS + PEDESTRIANS
- LEGAL SPACE FOR CYCLISTS
- REDUCE CAR LANES (WIDTH)
- SOLVE DELIVERY POINTS

3. Co-creation Outcome?

- RESIDENTS
- SHOP OWNERS
- Combine interests residents/shop owners and passing cyclists

Our Co-Creation Process

4. Select People

- PEDESTRIANS
- CYCLISTS ASSOCIATION
- SHOP OWNERS

5. Select Methods from the Menu

- DIARY
- MEETING
- BUILD-2
- VIDEO
- PRIORITY
- METHOD
- EVENT

6. if you have time...

- rethink participants
- sort methods into "Events"
- add "Venues" to events
- add "I benefit" to participants
- add "easy/medium/hard" levels (anywhere)

Link people, methods, events and venues!

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Figure 14 Zagreb, one of the SUM project's follower cities worked on how to design co-creative sessions to work out the conflict between pedestrians, cyclists and shop owners when reducing accessibility for cars in a city street.

Altogether, the workshop enabled the Living Labs to gain insights in ways to make co-creation happening in their cities and gave them some of the tools necessary for it to be successful. They also got inspiration to actually carry out these types of activities.

2.4 Co-creation in Coimbra

The final co-creative workshop within the timeframe of the SUM project was in Coimbra, and it's a good example of all the things that has been learnt in the project. In Coimbra, a new mobility hub that was under construction and its surrounding street space was selected to be the topic for a co-creative workshop. The previous activities had shown the importance of making all effort to engage as many relevant stakeholders as possible, both to catch as many relevant user requirements as possible, but more importantly to ensure that the outcome results in real change. The living lab spent a lot of effort recruiting participants and in the end the workshop had 49 participants.

The co-creation activity started with the Living lab representatives bringing the co-creation menu and the learnings from the project workshop back home to design a co-creative workshop together for the design of a new mobility hub. Throughout the design of the workshop, Chalmers supported with ideas, workshop materials, and workshop design input. A lot of effort was spent locally to ensure that all necessary stakeholders were active, and in the end there were representatives from the local citizens, teachers and parents from the nearby elementary school, students and staff from the nearby university, staff from the hospital (also close to the hub, a person in a wheelchair, local police, bus operators and bus drivers from booth operators, taxi drivers, micromobility operators, as well as city planners, traffic planners, parks and green environment, and local politics.

The workshop started with a visit at the site (Figure 15) at the intended site for the mobility hub in groups divided to ensure representativeness for all groups of stakeholders and to ensure as good power balance as possible. To assist in what to look for all groups got a map of the area and questions to try to answer. The site visit and the walk between the site and the elementary school where the rest of the workshop took place, started a lot of interesting discussions on topics such as parking, accessibility, shade, etc.



Figure 15 Participants in the Coimbra workshop at the worksite

The workshop then continued at the local elementary school (Figure 16). In this part of the workshop, the participants continued working in their groups, with one of the participants from the city planners responsible for each group. The groups had maps over the area, tracing paper to be able to draw over the maps, but also 3D printed vehicles of all sizes and models (buses, minibuses, cars, scooters, etc.), buildings and furniture. The groups played out different scenarios and tried to design solutions that worked for those scenarios. They had cards with instructions to keep the work on track (Figure 17). The diversity in the groups ensured that all important requirements for a mobility hub were discussed and incorporated in the design (Figure 18). The workshop ended with each group presenting their suggestions and motivating their design choices and then everyone voted for their favourite.



Figure 16 Participants discussing

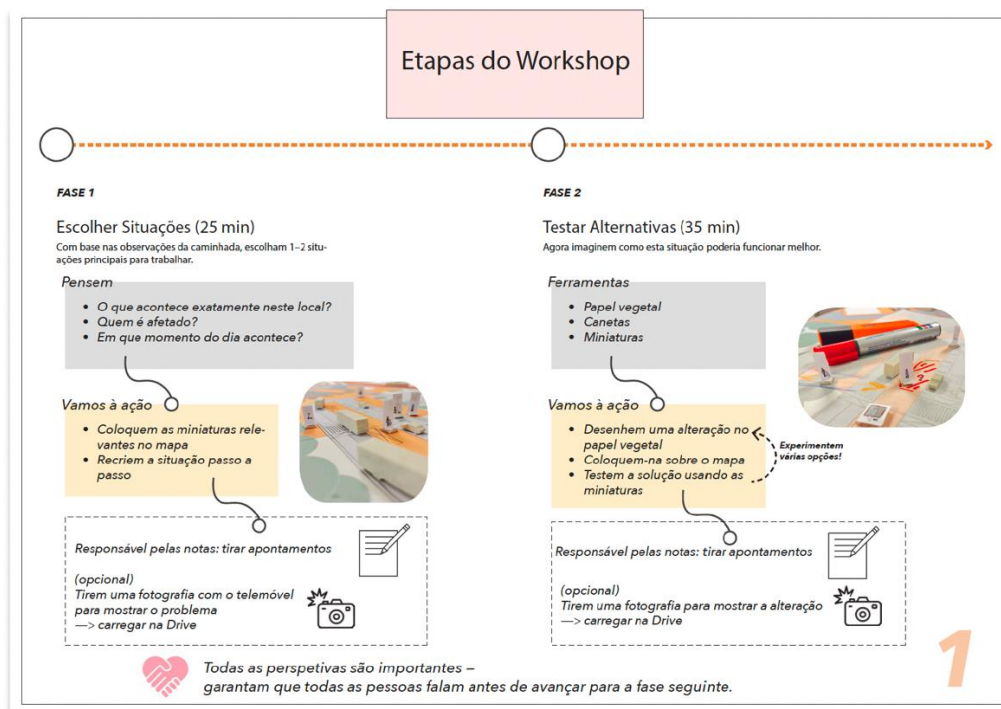


Figure 17 One of the instruction sheets developed for the workshop



Figure 18 The participants works with maps, 3D printed vehicles and buildings, in diverse groups ensuring all necessary competences and experiences

The participants in the workshop finally reflected individually on the workshop, and the overall impression was that they had learnt a lot and that the mobility hub would be much improved with the incorporation of the results of the workshop in the design. By involving key decision makers in the workshop, the probability of the result actually being used in the final design of the mobility hub is greatly increased.

3 Conclusions

Co-creation within SUM is both a methodological choice and a practical strategy for developing sustainable mobility solutions. While it introduces challenges related to hierarchy and engagement, its benefits—in terms of solution quality, legitimacy, and learning—are substantial. The Fredrikstad case illustrates how co-creation can transform a single infrastructure project into a broader constellation of services and practices, shaped collaboratively by those who use and manage them. When thoughtfully organised, co-creation not only produces better outcomes but also builds capacity, relationships, and shared ownership for future change.

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