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UPPER
Unleashing the Potential of Public Transport in Europe

D2.3 Gamified approach for co-creating inclusive PT solutions

WP2 User needs, baselines definition and project requirements

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Abstract

This report explores the use of the serious game method within the UPPER project as a tool for inclusive urban and transport planning, specifically to refine UPPER measures across various cities. The serious game method serves to complement traditional outreach methods and offers insights into needs of vulnerable groups reliant on public transport. The report outlines the background and methodology of the serious game, emphasizing co-creation and going beyond problem identification by encouraging participants to identify solutions. In Leuven and Versailles Grand Parc, the focus was on improving user information, especially for bus routes and a commuter train, addressing challenges like route diversions and accessibility, with considerations for, e.g., visually impaired individuals. Oslo and Thessaloniki examined demand-responsive transport (DRT) measures, emphasizing user-friendly DRT apps and well-trained staff among other factors. Valencia, Mannheim, and Lisbon concentrated on enhancing public transport stops and stations, touching upon issues such as weather, safety, and accessibility. The Region of Hannover and Budapest tackled different challenges, including enhancing the inclusivity of a bike tower and improving user satisfaction and service levels in public transport, respectively. The report also discusses the development of game materials, which focuses on tailoring challenges and game boards to suit various measures and target groups, with the intention of fostering productive discussions. In summary, the UPPER serious games revealed several common as well as site-specific challenges, including the need for accessible information regarding route deviations, informed and attentive staff, multiple channels of information, and physical design considerations for transport stops. The serious game method facilitated collaboration, offering new ways for vulnerable users to explain the challenges they encounter, and to identify co-creative solutions for enhancing public transport inclusivity, making it a valuable tool for future urban and transport planning initiatives.

Keywords

Co-creation, inclusive transport, serious game

Executive summary

This report discusses the use of serious games for the UPPER project as tool for urban and transport planning to gather user feedback, particularly from vulnerable groups dependent on public transport. The serious game method aims to complement traditional outreach methods and improve understanding of diverse user needs. The serious game approach was employed in the UPPER project to involve a wide range of users early in the development of transportation measures and to engage them in an in-depth discussion. The document outlines the background and methodology of serious games, emphasizing their role in co-creation and policy sensitization. The games encourage participants to create solutions and go beyond problem identification. The document shows the steps to develop a serious game, including identifying a specific context, creating meaningful challenges, designing the game elements, providing information on the measure, and identifying target groups.

The serious games in the UPPER project were used for refining a selection of measures which would benefit from direct input from vulnerable users. In Leuven and Versailles Grand Parc, the focus was on improving public transport user information. In Leuven, this centred on bus routes, particularly during unexpected changes. The game led to considerations for adapting it for visually-impaired individuals, such as translating challenges into braille and creating tactile game elements. Versailles Grand Parc's serious game focused on user information for the commuter train. The game aimed to understand how users would like to receive information about the routes during regular service and disruptions. Key insights included the importance of friendly staff, improved maps, and advance warnings route disruptions.

Oslo and Thessaloniki examined demand responsive transport (DRT) measures. In Oslo, the specific focus was on use of an existing app for the DRT system for the elderly. Participants found the app user-friendly, with training programs available for seniors. However, some less digitally inclined users still faced hurdles. Thessaloniki's serious game addressed a DRT service for nearby towns, exploring various challenges related with weather conditions and traveling with children. The participants suggested the importance of well-trained staff, suitable DRT stop locations, well-equipped vehicles, real-time information, and flexibility in booking. The game emphasized minimizing waiting times, adhering to schedules, and providing cancellation options.

Valencia, Mannheim, and Lisbon, focused on enhancing public transport stops, stations, and the surrounding areas. Valencia's serious game aimed at creating more inclusive bus stops, emphasizing challenges related to weather conditions, safety, and user experiences. Participants suggested increasing shaded areas, safety measures, and accessible design. They discussed visual and audio information, ticketing options, and the need for better driver training and on-board accommodations. Mannheim's focus was on improving public transport stops, addressing aspects like accessibility, security, comfort, and cleanliness. The game involved visiting different stops, each with different challenges. Participants noted the importance of visible passenger information, minimal waiting times, and a pleasant environment at stops. Lisbon's game considered various user information and multimodal transportation challenges across bus, train, boat, public space, and interfaces. Participants discussed the need for staff training to cater to diverse user needs and emphasized the importance of designing accessible infrastructure.

The Region of Hannover chose to focus on enhancing the inclusivity and user-friendliness of a new bike tower at a regional train station in Wunstorf, which is set to become operational in October. During the serious game, participants were given a tour of the bike tower, followed by a game session in a nearby community centre. Main convergent ideas from the game sessions included the need for restroom facilities at the station, an emergency hotline for technical issues, clear signage with easy-to-understand language, and an explanatory video about how the bike tower operates. In Budapest, the focus was on user satisfaction and service levels in public transport. Participants described their typical city trajectories and challenges before selecting challenge cards. Ideas for incorporation into the measure included researching decision-making mechanisms related to car ownership and shared mobility options. The game's design allowed for discussions with typical users, not just vulnerable groups, making it useful for diverse participant profiles.

In summary, the UPPER Serious Games reveal commonalities across many cities. The common challenges include passengers needing information about deviations from standard bus routes through multiple means like signs, apps, and SMS. Additionally, advance communication of known route changes and details of deviations are crucial for

passengers to make necessary arrangements. An important solution is the need for informed, helpful, and attentive staff or drivers, especially when assisting vulnerable passengers. The presence of staff at stations is also helpful, but often they are either absent or uninformed about various topics. The games emphasized the importance of multiple channels of information, including visual, tactile, and audible cues, catering to diverse user needs. Consistency in the information network during emergencies is critical, particularly for people with disabilities. The games also showed there is widespread use of mobility apps by various user groups, suggesting that good practices for app development are available. Issues related to correct real-time information, improved maps, concerns about digital ticketing were also commonly discussed. The physical design of transport stops and urban spaces, including placement of bike lanes near bus shelters and creating less slippery surfaces are important for comfort as well as safety for many passengers. Finally, the importance of safety through human presence is emphasized as a crucial consideration in public transport systems.

The serious game method provided a platform for identifying and addressing challenges faced by vulnerable users, fostering collaboration, and offering creative solutions to enhance public transport inclusivity. The insights gathered through this approach can contribute to the ongoing efforts to make public transport and cities more inclusive for all users. Ultimately, the UPPER Serious Games served as a valuable tool for collecting real-life challenges and co-creating solutions to improve public transport accessibility. The game's adaptability and effectiveness offer potential benefits for future urban planning and transport initiatives aimed at enhancing inclusivity.

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Table of Contents

Table of Tables

Table of Figures

Table of Pictures

1. Introduction to the Serious Game

Within urban and transport planning, many different methods are used to identify and understand user needs and provide a high-quality public transport service. In many cities, there is a significant amount of information available in the form of statistics and modelling. This is often complemented with various qualitative research approaches to create a more complete picture of use of the transport system. Many agencies, cities, and universities conduct surveys on a variety of topics including user or customer satisfaction. Additional qualitative studies aim to gain insight and understanding about situations where quantitative data or surveys do not capture the entire picture or do not address particular groups. Additionally, cities engage in public outreach activities which might take different forms, including public forums, engagement workshops, or focus groups. In some cases, there are regular in-depth interviews with citizens on different topics related to transport. All these methods are important for understanding the public transport user landscape within cities.

The serious game approach, like similar in-depth, qualitative studies, is meant to complement other forms of analysis and methods for gathering citizen feedback. The concept of the serious game used for the UPPER project was developed to increase representation of a variety of user groups in creating transport services. In particular, the goal was to engage vulnerable groups who are very dependent on public transport but may be less likely to participate in more typical public outreach forums (Brandsen, 2021). This co-creation and gamified approach is one method which can help to develop a more inclusive transport system, which has become a major priority in many European countries (Gallez & Motte-Baumvol, 2017). In addition, the combined input of many participants across many games has been collected and used to create a game to sensitize policy makers to the needs and common experiences of public transport users (CATAPULT, 2023).

The serious game was used during the first nine months of the UPPER project for measure fine-tuning and helped to incorporate user perspectives early on in the development of the UPPER measures. The process of adapting the serious game concept for each UPPER site was led by the KU Leuven team with an extensive collaborative effort from the demo sites to create unique game concepts, host and moderate games, as well as identify and engage participants. In some cases, the game was developed among a relatively small group from the demo site; in other cases, a large team was engaged to carry out the game in order to align with outreach protocols in a particular agency or city. Completing the games was aided by the fact that many transport agencies involved in the UPPER project have departments specifically focused on public outreach and stakeholder engagement. This engagement can be related to general customer service and user satisfaction, or specifically focused on gathering input from vulnerable road users.

The UPPER project has also been an opportunity to further test the serious game method as an outreach tool and identify elements of success for this approach. Throughout this document, we demonstrate the variety of ways the serious game concept was used among the UPPER cities, which reflects considerations for different types of measures covered as well as different cultural contexts or users who participated. This report discusses both the insights collected for the measures as well as practical considerations for adapting and using the game in different contexts.

This document first gives the background of the serious game and methodology. Next, there is a summary of each of the serious games at different UPPER sites and the game results. This is followed by a discussion of some of the practical elements of putting together a serious game. Finally, results related to both the UPPER measures as well as insights into how to use this approach in other locations are discussed. Full details of each of the games and a summary of the results are included in the Annex.

1.1 Background of the serious game and method

The serious game is a format of public participation, similar to a focus group, designed to gather input from individuals who rely on public transport but are often unable or unlikely to participate in more standards types participatory formats. The game methodology was designed from previous experiences and expert consultation within the fields of co-creation and gamification. Many different versions of the game have been developed specifically for transport

and tested with a variety of participants (Casiano Flores et. al, 2023). The results of the serious game in previous projects showed that it was an effective method for gathering input from vulnerable groups and can alert providers to specific details of infrastructure or user information, for example, which can make the public transport system significantly more or less convenient for individuals (CATAPULT, 2023). This provided the basis for expanding the use of the game into the UPPER cities, making it a tool for leaving nobody behind in the process of introducing measures with the overall target of increasing the use of public transport by >30% and the user satisfaction by >25%, .

The gamified approach aims to get input from vulnerable groups, specifically, the elderly, children, or people with disabilities. However, the method can be used for a co-creation approach among a variety of participants, as it has some important elements which contribute to inclusiveness. First, the game is based on the concept of collaborative story-telling, aided by maps and visuals that stimulate and support participant discussion (Panagiotidou et al., 2022). Second, following co-creation literature, the game is meant to be played with small groups of roughly four people. The game format, along with a small number of participants, ensures that each player has a chance to provide their opinion, by having their own turn and receiving their own challenge cards to respond to. Relatedly, the game format can be used to help with moderation to ensure a balanced discussion among players. In addition, the goal of the game format is not only to identify challenges, but to encourage participants to create solutions in a collaborative way which can account for their different needs.

The following describes some of the general steps needed in order to develop a serious game:

- The first step is identifying a specific context for the game. This includes selecting a measure or project within a city, identifying the target groups the game developers would like to reach, and understanding the specific situation for which they would like additional information.
- Based on this specific context and situation, the next step is to develop challenges that users might face. From previous serious games, a compilation of potential challenges was made (based on CATAPULT, 2023) which could provide inspiration for challenges used in other cities during the serious game. The idea is to develop challenges that dig deeper than common feedback which agencies may already be aware of such as “the bus stop is dirty” or “there are not enough buses.” The idea of the challenges is to identify specific problems which can make the public transport system (or other depending on the measure) more convenient or useful for various groups of people.
- The next step is to develop the physical game. This includes a game board, the challenge cards, and the game pieces. There are many practical considerations that go into developing the game, for example:
    - Game boards can vary depending on the measure, target groups, and type of feedback needed. Games can be developed from standard maps, landmark or tourist maps, or can be more abstract and just show pictures or landmarks.
    - The challenge cards should be large enough that they are easy to read and manipulate for people of all ages.
    - The game pieces can also vary based on the project, though even standard game pieces for any game board can be used.
- It is also useful to have a presentation with key information on the planned measure so that participants know what they are expected to comment on. Videos and pictures are also useful to help users understand what the

measure will look like. The major value of this step is to focus the discussion on particular elements of the transport system that will be addressed during the serious game.

- Once the game has been prepared, participants are found for each game session. More than six participants can result in individuals not having enough opportunity to participate (Casiano Flores et. al, 2023). In the UPPER sessions, four to six participants were suggested per session, but this was flexible, allowing to adapt to local culture, participants needs, etc. Three to four participants appeared to be the ideal number of participants for the game to give all individuals an opportunity to speak.
    - Unlike statistical analysis or surveys, this approach does not require a random sample of participants. At the same time, results are not meant to be representative of the entire population, and results should be interpreted with this in mind.
- The game sessions can last between 45 minutes and 1.5 hours. The instructions for the game session are:
    1. Place the board on the table or surface area that all players can reach comfortably.
    2. Each player will receive a game token representing themselves.
    3. First player rolls the dice.
    4. First player picks a challenge card.
    5. Players must explain what new needs the picked challenge creates, and collaborate with the other players to add information.
    6. After the player has identified the needs, the facilitator will ask what can help to resolve them.
    7. When a solution is developed, first player moves forward on the game board.
    8. The note taker will write the need and the solution in the corresponding cards.
    9. Continue with next player until all challenges have been addressed or the discussion begins to repeat previously discussed ideas.
- There can be slightly different structures for each game. In general, a moderator and a notetaker is needed. Players take turns responding to challenge cards and developing solutions.
    - Depending on the context, different types of moderation can be used. The moderator can range from someone with more experience to a student with an interest in moderating. The moderator(s)' role is that of participant-observer (Merriam, 2009). Therefore, the moderator can be involved in the game and offer opinions; however, the moderator should also be mindful of creating an environment where participants with different abilities can provide their opinion freely.

2. Developing Serious Game Materials

As the serious game was used for measure fine-tuning, this could only take place after demo sites had developed and prepared an initial description of their intended measures. During this measure development process, demo sites detailed specific stages of measure implementation, identified which target groups would be impacted, and described expected impacts and impact areas of the measures. As a result of this process, project teams could select which measure would benefit from additional public input, primarily from vulnerable groups, at the measure development stage.

After selecting a measure, the next steps were to adapt the game to address the specific measure. This also allowed for demo sites to create their own game board and challenges, as well as host the game in a situation that made sense given their local context. It was important to develop the right materials for the right audience and measure. Both the challenge cards and game boards were meant to stimulate storytelling and discussion.

2.1 Developing challenges

To develop challenges, first it was important to identify the measure to focus on as well as target groups. We used inspiration from previous games and tailored the challenges to different situations. Because only a small number of challenges would be discussed in each game, it was important to design challenges that would provide useful information about a particular topic. If game designers have identified particular issues related to the measures where they would like feedback, this can be incorporated into challenges. At the same time, if there are known solutions or suggestions which often come up during public outreach sessions, the challenge cards can be used to steer discussions into new avenues.

Additionally, the challenges should be geared towards the general public who may have a lot of experience with public transport use but not be aware of specific technical terminology. Also, while we would like to focus on issues of vulnerable groups, it is important that the challenges themselves are not stigmatizing. This is an opportunity to be creative, to hopefully spur new ideas and perspectives on different transport challenges. Overall, the challenges are related to weather, carrying heavy items, traveling with people who need care, traveling with limited physical abilities, and traveling at different times of day or seasons. All challenges are listed by topic below.

TABLE 1. - Challenges related to User Information

Measure	Situation	Question
User Information (Leuven)	It's Open Monument Day. You have a reservation to visit the restauration of the Vesalius anatomic theatre. The entire area is a wharf. You have no problem going to the railway station. You need to arrive at the Vesalius heritage site entrance between 13:45 and 14:00.	What is the most convenient way for you to find information on the buses from the station to the anatomic theater?
User Information (Leuven)	There are construction works on the road. The bus takes a different route, one that you don't know. You start to panic!	What information should the bus service provide to make you feel confident where to get off the bus to reach your destination?
User Information (Leuven)	There is a fancy new online ticketing system that no longer gives you a paper ticket.	How can you trust that your ticket is OK (paid for correctly)?

User Information (Leuven)	You took [a very vulnerable person] to town for shopping. He/she is used to taking the bus, but cannot normally take the bus alone. You twisted your ankle and need medical help. Someone can pick up the very vulnerable person at the bus stop near his/her home.	What is needed for you to send this vulnerable person home by bus?
User Information (Leuven)	Reorganization of the service, the bus-numbers have changed!	What is the most convenient way for you to get information on changes in the bus service (before getting on)?
User Information (Leuven)	You are on the bus to the city centre. Again deviations due to an event! Where do I have to get off the bus?	What is the most convenient way for you to get information on changes in the bus service (while in the bus)?
User Information (Leuven)	Problem! There is a mechanical issue and the bus stops.	What should the bus service provide to remedy this inconvenience?
User Information (Leuven)	Oh no! You forgot your backpack in the shuttle!	What should the bus service provide to solve this issue?
User Information (Leuven)	You want to buy a ticket via the app on your phone. But right now, your phone drops dead!	What should the bus service provide so you can ride without being a free rider?
User Information (Leuven)	You want use the bus service to travel to a PT stop but the service is disrupted by a bus drivers' strike.	What should the bus service provide to facilitate your transport?
User Information (Leuven)	You want to get off the vehicle, but the doors do not open!	What should the bus service provide to solve this issue?
User Information (Leuven)	It rains/snows/freezes and you are afraid of slippery pavement	What should the city provide you as information to help you choose your walking route to the bus stop?
User Information (VGP)	You have to go to the Saint-Michel district in Paris but a strike notice impacting public transport is planned.	How do you react in this situation? What information would you need to make your journey? What could be improved in passenger information?
User Information (VGP)	You have to go to the Saint-Michel district in Paris but bad weather impacts the operation of the RER C for several days.	How do you react in this situation? What information would you need to make your trip? What could be improved in passenger information?
User Information (VGP)	You want to go somewhere you've never been before. You want information on the best way	How do you try accessing this information ?

	to reach your destination (bus line number, connections, estimated travel time, etc.).	
User Information (VGP)	You are waiting for the bus, it is dark or you are in an isolated area and there is no one other than yourself at the stop.	What security measures or amenities would you like the bus stop to have to make you feel safe?
User Information (VGP)	An aggressive person is waiting at the stop and there is no one providing security.	How should the station environment be designed to make you feel safer?
User Information (VGP)	You are waiting for the bus, there is no one else with you at the stop and you encounter difficulties or problems (with the ticket office, the information available at the stop, etc.).	How do you react in this situation? Would you like the bus stop to integrate a communication system to contact an emergency assistance service (police, technical support, etc.)?
User Information (VGP)	You arrive at the stop and do not know when your connection will leave (only the theoretical timetable is available)	How do you react in this situation? What features should the stop have to provide clarity to the user?
User Information (VGP)	From the Versailles Grand Parc area, you want to go to Paris-St Michel but upon arriving at Versailles Chantier station, you notice that the RER C has a technical problem and a significant delay is expected (traffic resumption time not estimated).	How do you react in this situation? What traveler information do you think is necessary?
User Information (VGP)	You're waiting at your usual stop and want to go somewhere you've never been before. You want information on the best way to reach your destination (bus line number, connections, estimated travel time, etc.).	How do you want to access this information? What features should the stop have to provide clarity to the user?
User Information (VGP)	You want to go to Paris-St Michel but the line experiences a malfunction while you are on the train.	What type of information would you like to have (resumption time, nature of the breakdown, arrival time at the stations, etc.)?
User Information (VGP)	The train arrives at the station but it is crowded.	How do you react in this situation? Does information on train saturation seem relevant to you?
User Information (VGP)	You arrive at your destination station.	What information would you need to complete your trip?
User Information (VGP)	You have to go to the Saint-Michel district in Paris but a strike notice impacting public transport is planned.	How do you react in this situation? What information would you need to make your journey? What could be improved in passenger information?

User Information (VGP)	You have to go to the Saint-Michel district in Paris but bad weather impacts the operation of the RER C for several days.	How do you react in this situation? What information would you need to make your trip? What could be improved in passenger information?
User Information (Valencia)	There is an event in the city (Fallas, a race, a demonstration) that forces EMT to make a change in the bus lines. You don't really know if the line and stop you usually take will be running during those days.	What information would you like to receive in these cases? What is the most convenient way to be informed about the planned changes? By what means (at the bus stop, on board, Twitter, APP, SMS)?
User Information (Valencia)	You want to catch the bus that passes in front of your house at 17h, but there is an unexpected change in the line due to an accident and collapse on the road. Some of the buses are being rerouted to another stop.	What information would you like to receive in these cases (alerts, alternatives...)? By what means (stop, Twitter, APP, SMS, audio...)?
User Information (Valencia)	You are at a bus stop waiting for your bus. Several lines pass by that stop.	What information would you like to receive regarding upcoming buses (actual arrival time of the next buses, line disruptions, unexpected delays...)? By what means (at the bus stop, on board, Twitter, APP, SMS, audio...)?
User Information (Valencia)	The bus you want to catch is approaching the stop where you are. You are uncomfortable getting on a bus and there is no room to sit down, or it is too crowded, for example. You are also afraid of getting on the wrong bus.	What information would you like to receive before the bus arrives (bus destination, occupancy, space availability for VRUs...)? By what means (at the bus stop, on board, Twitter, APP, SMS, audio...)?
User Information (Valencia)	You are on board a bus. You're not too used to taking this line, so you don't know the stops and the exact route.	What information would you like to receive while you are on board (next stop, changes in the line, connection with other means of public transport such as metro, tram, or other bus lines...)? By what means (at the stop, on board, Twitter, APP, SMS, audio...)?
User Information (Valencia)	The bus you are on is at a standstill (due to a traffic jam, an accident or a technical problem). You don't know how long it will be stopped, so you don't know whether it's better to get off or wait. You have a lot of doubts and uncertainty.	What should the EMT service do to remedy this inconvenience? What information would you like to receive in such a situation (estimated delay time, alternatives of other modes...)? By what means (at the bus stop, on board, Twitter, APP, SMS, audio...)?
User Information (Valencia)	You are on the bus, but suddenly the bus takes a different route due to roadworks. The bus takes a detour through an unfamiliar part of the city and you are not sure where to get off.	What should the EMT service offer to make you feel safe? What information do you need to know the best way to get to your destination? What is the most convenient way to get information about changes in the bus service (while on the bus)?

User Information (Valencia)	You're on the metro and you know that, when you get to the Alameda stop, you'll have to get off the metro and take a bus. However, you don't know if you're going to have to wait a long time, if the bus is late, if it's very full... In short, you don't know if the bus is the best option or if it's better to look for an alternative.	What information would it be useful for you to receive before going to the bus stop in order to solve your doubts? By what means (at the bus stop, on board, Twitter, APP, SMS)?
User Information (Valencia)	EMT reorganises its service - the bus numbers have changed!	What (how and when) is the most convenient way to be informed about changes in the bus service (before boarding)? By what means (at the bus stop, on board, Twitter, APP, SMS)?
User Information (Valencia)	You want to use the bus service to go to a bus stop, but the service is disrupted by a bus drivers' strike.	What should the EMT service do to make transport easier for you? What information should it provide you with? By what means (at the bus stop, on board, Twitter, APP, SMS, audio...)?

TABLE 2. - Challenges related to DRT services and apps

Measure	Situation	Question
DRT (Oslo)	You want to use the app, but are unsure how to do so.	What type of guidance would you prefer? (written/presentation/demo)
DRT (Oslo)	You wish to book a trip via the app, but struggle to read the text on your mobile phone screen.	How can the visibility be improved?
DRT (Oslo)	You tried to make a reservation, but are unsure whether it went through/was registered.	How can we assure you that the trip has been booked?
DRT (Oslo)	You booked a trip via the app, but need to change or cancel it.	How can be assure you that your change/cancellation has been registered?
DRT (Oslo)	You booked a trip a few days ahead, but can't remember the exact day or time.	How can we help you find this information?
DRT (Oslo)	You're waiting for your pre-booked bus and wondering whether it's going to be on time.	What type of information/contact/dialogue do you need?
DRT (Oslo)	You're waiting for your bus, but it appears to be delayed.	What type of information/contact/dialogue do you need?
DRT (Oslo)	You're waiting for your bus and want to make sure you prepare yourself/leave the house in time for its arrival.	What type of information/contact/dialogue do you need?

DRT (Thessaloniki)	There are construction works on the road. The vehicle takes a different route, one that you don't know. You start to panic!	What should the DRT service provide to make you feel safe?
DRT (Thessaloniki)	Problem! There is a mechanical issue and the vehicle stops.	What should the DRT service provide to remedy this inconvenience?
DRT (Thessaloniki)	Oh no! You forgot your backpack in the vehicle!	What should the DRT service provide to solve this issue?
DRT (Thessaloniki)	You booked your ticket via the app on your phone earlier, but by the time you want to use it, your phone drops dead.	What should the DRT service provide so you can ride without being a free rider?
DRT (Thessaloniki)	You want use DRT service to travel to a PT stop to travel to the city centre but the bus drivers are on strike.	What should the DRT service provide to facilitate your transport?
DRT (Thessaloniki)	You are travelling with a toddler in a stroller, with a lot of bags.	What should the DRT service provide to make you feel safe and comfortable?
DRT (Thessaloniki)	You are traveling with an infant/toddler and there is traffic on the road. Your infant/toddler gets upset.	What should the DRT service provide to help the infant/toddler relax?
DRT (Thessaloniki)	DRT stops can be flexible and due to many requests, a longer detour and travel time is expected.	What should the DRT service provide you for mitigating the negative implications of the increased travel time?
DRT (Thessaloniki)	It is a long walk to the fixed DRT stop and the road feels unsafe because of many cars.	What should the DRT service provide to make you feel safe?
DRT (Thessaloniki)	It is a long walk to the fixed DRT stop and it is a very hot day.	What should the DRT service provide to make you feel more comfortable?
DRT (Thessaloniki)	To guarantee the right time slot, you must book the DRT at least 12 hours before the trip; however, you are not yet totally sure about the time that you would like to start your trip.	What should the DRT service provide to assist you organize your trip properly?
DRT (Thessaloniki)	You sent your trip request 10 minutes ago but the service provider assigns you to a route that is going to start 1 hour later than what you wanted.	What should the DRT service provide you for mitigating the negative implications of the increased waiting time?
DRT (Thessaloniki)	You want to get off the vehicle, but the doors do not open!	What should the DRT service provide to solve this issue?
DRT (Thessaloniki)	The sun is shining, you are in the vehicle which heats up very quickly. You get too hot.	What should the DRT service provide to make you feel comfortable?

DRT (Thessaloniki)	When you get inside, the vehicle departs immediately and very abruptly. You may fall and you break your hip!	What should the DRT service provide to alleviate/avoid this issue?
DRT (Thessaloniki)	DRT stops can be flexible and due to many requests, a longer detour and travel time is expected.	What should the DRT service provide you for mitigating the negative implications of the increased travel time?
DRT (Thessaloniki)	You want to book a ride with the DRT service but can't read the text on your cell phone screen.	What should the DRT service provide to facilitate your booking?
DRT (Thessaloniki)	I would like to know if by choosing a DRT ride, my travel becomes eco-friendlier.	What should the DRT service provide you to assess your footprint?

TABLE 3. - Challenges related to PT stops and interfaces

Measure	Situation	Question
Valencia (PT stop)	You find yourself waiting for the bus at the stop. It's summer, and the temperatures are very high. Not only that, but the sun is also shining intensely, which can lead to heat strokes.	What adaptations or functionalities should the bus stop have to ensure the comfort of the user?
Valencia (PT stop)	You arrive at the bus stop, but all the pre-trip information such as the estimated time until the next bus, line stops, etc. is visually provided.	Through what means and how would you like this information to be provided at the stops?"
Valencia (PT stop)	There is new ticketing system for the BRT which requires paying in the bus stop, and not onboard the bus.	Which aspects should be considered for this new ticketing system (location, instructions, use,…)? How can you trust that your ticket is OK (paid for correctly)?
Valencia (PT stop)	The bus service has been expanded (new lines and stops have been added).	How would you prefer to receive this new information, both inside the bus and before boarding?
Valencia (PT stop)	You're waiting for the bus at the stop, and you see it approaching (especially critical in a BRT). The bus stops, but you encounter difficulties accessing the interior.	How would you modify the bus stop to facilitate boarding? And in case of a BRT, how would you modify the stop to guarantee the quick access? (E.g., installing platforms that elevate the stop, define the area for VRUs to access the BRT,…).
Valencia (PT stop)	You're waiting for the bus, it's nighttime or you are in an isolated area, and there's no one else with you at the stop.	What safety measures would you like the bus stop to include to ensure you are safe or you feel safe?

Valencia (PT stop)	You're waiting for the bus, and there's no one else with you at the stop and you are facing some difficulties or problems (with the ticketing, the access, the information available in the stop,…).	Would you like the bus stop to include a communication system that allows you to contact an emergency assistance service (police, technical support, etc.)?
Valencia (PT stop)	It is raining. The platform is slippery. You are afraid that you will fall when you get out of the bus.	What should the shuttle service provide to avoid this issue?
Valencia (PT stop)	You're waiting at your usual stop, and you want to go to a location you've never been before. You would like to obtain information on the best way to reach your destination (bus line number, transfers, estimated travel time, etc.).	How would you like to access this information?
Valencia (PT stop)	It is Fallas and the bus line you usually take for your daily chores is overwhelmed by crowds of people.	How do you think this situation can be improved?
Mannheim (PT stop) - Attractiveness	The S-Bahn does not run and there is a rail replacement service.	What information should be provided and in what way so that the bus can be easily found by yourself?
Mannheim (PT stop) - Attractiveness	You want to take public transport home after work and you're in a hurry.	What challenges do you see at this PT stop? What could be improved/changed at the PT stop?
Mannheim (PT stop) - Accessibility	You've broken your leg; you're walking on crutches, and you want to take the tram. However, the elevator is defective, and you can't get to the platform level.	What alternative entrances to the platform level should there be and how should they be designed?
Mannheim (PT stop) - Accessibility	You are traveling with a stroller and a toddler. To get to your train, you have to cross the rails.	What adjustments should the PT stop have to ensure the user's accessibility?
Mannheim (PT stop) - Safety	An aggressive person is waiting at the bus stop, and there are no security guards.	How does the PT stop environment have to be designed so that you feel safe?
Mannheim (PT stop) - Safety	You're alone at the bus stop in the evening, it's dark and you're waiting for your train.	How does the PT stop environment have to be designed so that you feel safe?
Mannheim (PT stop) - Comfort	You're standing at the train station and it's pouring rain. The train is delayed and because of the school children there are not enough opportunities to shelter	What adjustments or features should the PT stop have to ensure the user's comfort?

Mannheim (PT stop) - Comfort	You stand at the bus stop and wait for the bus. It's summer, and the temperatures are very high. In addition, the sun shines very strongly, which can lead to heat strokes.	What adjustments or functions should the PT stop have to ensure the comfort of the user?
Mannheim (PT stop) - Multifunctional	You arrive at the station and don't know when your connecting train will leave.	What adjustments or functions should the PT stop have to ensure the comfort and clarity of the user?
Mannheim (PT stop) - Cleanliness	You're tired and want to sit down at the stop, but all the chairs are dirty, and the floor is dirty.	What components must be present at the PT stop to ensure user comfort?
Lisbon (PT interface)	I usually make my commute from home to work by bike. It's early evening and I punctured a tire. My house is served by metro and buses.	How can I know the best alternative for getting home by public transport with my bike? (identify the best route that accepts bicycle transport).
Lisbon (PT interface)	The route I must take has information available with a certain colour palette. However, I am colourblind and cannot distinguish any relevant information.	What should the operator do so that the service information available at stops and on the internet/app can be correctly interpreted by colour blind people?
Lisbon (PT interface)	I'm a foreigner, I don't speak Portuguese or English and I'm blind. I want to travel on public transportation, and I need to know where the stop is and to know about the lines and schedules.	How can transport operators guarantee the possibility of using the service for people in this situation?
Lisbon (PT interface)	My house is situated nearby a construction work that is starting and will last 6 months. The route and bus stops took a big detour. I have a permanent injury and need to commute to work on public transport.	How should the operator inform users about how to get to new stops and route changes?
Lisbon (PT interface)	On the way to the station there is a street with narrow sidewalks and many cars passing at high great speed. You are afraid to let your child go alone to the school on public transport because he must use and cross this street.	What should be done in terms of public space so that children can walk to school and use PT safely?
Lisbon (PT interface)	I must go to a bus stop that has no paved sidewalk leading to it, and with the rain, is full of mud. I feel like complaining about the situation and I don't know how....	What should be done to avoid situations of this type and to ensure information about the suggestion/complaint mechanisms?

TABLE 4. - Challenges related to the Bike Tower

	Situation	Question
Hannover (Bike Tower)	You're standing at the train station and it's raining cats and dogs. The S-Bahn is late and comes later.	What service should be provided for the extended waiting time?
Hannover (Bike Tower)	The cell phone's battery/internet is empty and the bike tower cannot be opened.	What alternative secure parking facilities should be provided?
Hannover (Bike Tower)	You stand in front of the bike tower with a special bike. You notice that it doesn't fit in the tower.	What alternative secure parking facilities should be provided? How should it be communicated which bikes fit in the tower?
Hannover (Bike Tower)	You want to park your bike in the bike tower. The display shows that the tower is full.	What do you do?
Hannover (Bike Tower)	You are a mobility-impaired person and would like to take the S-Bahn. However, the elevator is broken and you cannot get to the platform level.	Which alternative accesses to the platform level should there be and how should they be designed?
Hannover (Bike Tower)	You are a person with limited mobility.	How should the area surrounding the station and in particular the bicycle tower be designed?
Hannover (Bike Tower)	You are cycling with family/children and want to use the bike tower	What should the bike tower provide to be more useful for families?
Hannover (Bike Tower)	There is a defect in the bike tower and the bike cannot be registered/ handed out.	How should the defect be reported? What service should be provided so that the problem can be solved quickly?
Hannover (Bike Tower)	You're running late and might miss the S-Bahn.	where do you park your bike? What information about the departure time should be communicated and in what way?
Hannover (Bike Tower)	You want to park your bike in the bike tower but don't understand how the tower works.	How should the system be set up to make it easier to understand how the tower works? What information should be made available?
Hannover (Bike Tower)	The S-Bahn does not run and there is rail replacement service.	What information should be made available and in what way so that the bus can be easily found by the rail replacement service?
Hannover (Bike Tower)	There are 15 people in a queue in front of you in front of the bike tower. But you are in a hurry.	Which alternative offers and information should be made available on which channels?

Hannover (Bike Tower)	It's a rainy day and the S-Bahn is late.	Which places to stay would be suitable to bridge the time of waiting? How should the station environment be designed?

TABLE 5. - Challenges related to User Satisfaction

	Situation	Question
Budapest (User Satisfaction)	Everyday travel	What routes do you usually use in your everyday life and what kind of transport modes do you use during these trips? Do you combine different transport modes and what are the factors that might influence your decision to select a mode?
Budapest (User Satisfaction)	You are travelling with children or with many luggage.	How does it affect your transport habit? Would it change your transport mode selection?
Budapest (User Satisfaction)	You are going on a journey during a pleasant spring weather. / It is raining and the wind is blowing.	How does it affect your journey if you go to work, meeting friends, shopping or running errands?
Budapest (User Satisfaction)	You need to get to the other side of the city to a neighbourhood you are not familiar with.	How do you get there? What transport mode do you select?
Budapest (User Satisfaction)	A traffic malfunction occurs suddenly, which also affects your trip.	How does it influence your journey? What do you do?
Budapest (User Satisfaction)	You need to get to various places around the city within a day, which can be found at greater distances from each other.	How do you get there? What transport mode do you select?
Budapest (User Satisfaction)	You are going to an interview, where you need to arrive on time. / You are visiting you relative randomly, where do not need to arrive accurately.	How do you get there? What transport mode do you select? Is it different in the two situations?

2.2 Game boards

The game board designs evolved during the project. We initially started with maps of the cities of Leuven (**Error! Reference source not found.**) and Valencia (Figure 2**Error! Reference source not found.**) with certain stop locations highlighted. The objective in the Leuven gameboard was to use the bus stops to get to a new location in the city. The objective of the Valencia gameboard was to make a circuit around the city. Rome also used a map of the local area (Picture 1**Error! Reference source not found.**). The Budapest game board (Figure 3**Error! Reference source not found.**) built on this idea and used an existing transport map of the city. While the “game” objective was slightly less clear in this map, the map itself was very engaging for participants as they could

describe where they typically travel in the city with the help of a visual aid. The Versailles Grand Parc gameboard (Figure 4) also used an existing transport map and highlighted the RER C commuter train which was the focus of the game. This gameboard was a mix between the more realistic maps and the more abstract maps and also gave participants the specific objective to cross the VGP territory.

FIGURE 1. - Leuven Gameboard

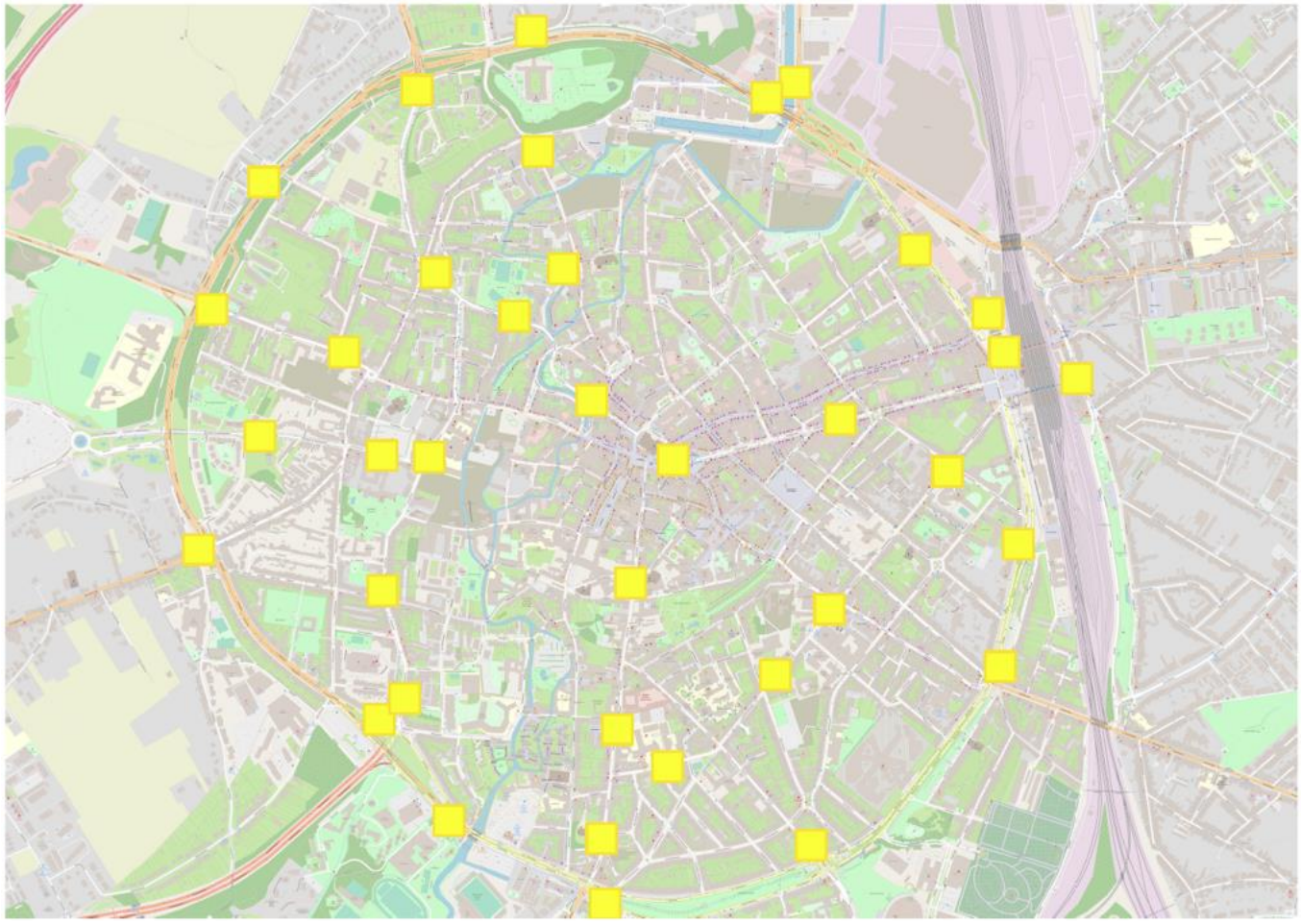
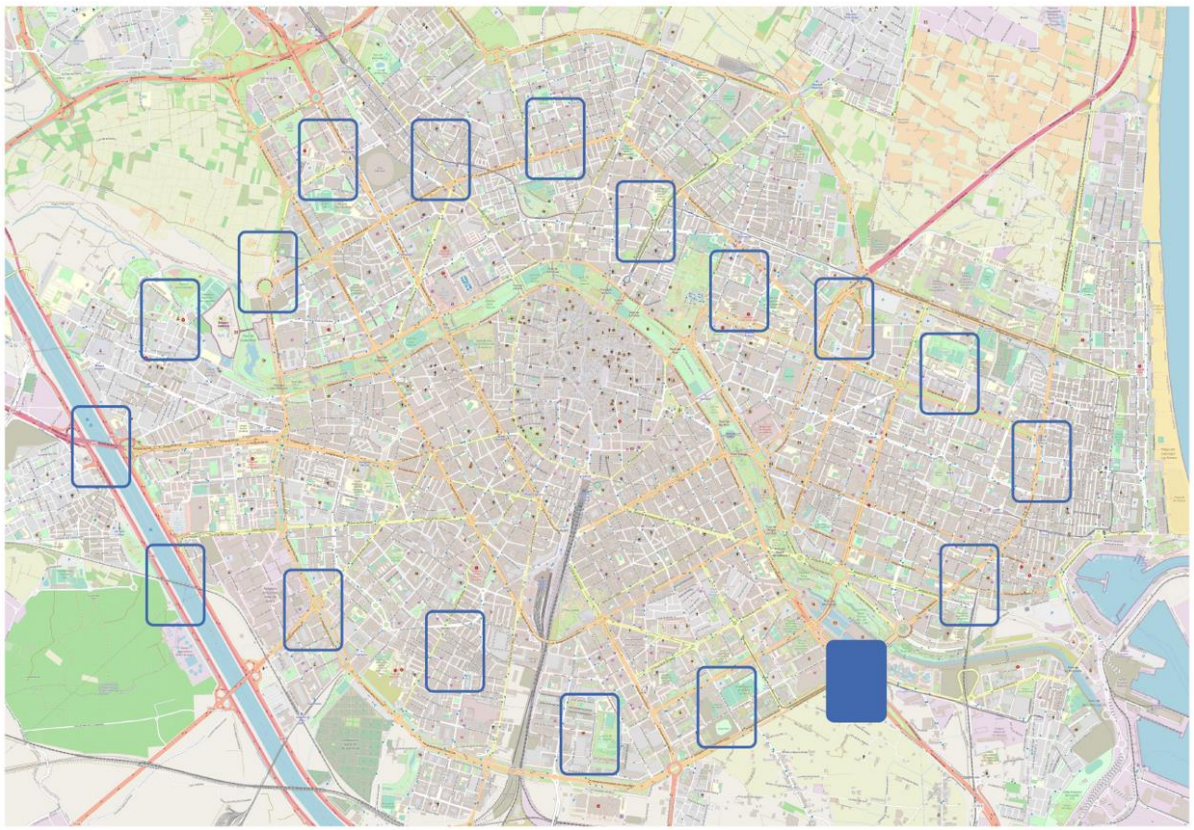


FIGURE 2. - Valencia Gameboard



PICTURE 1. - Rome Map

FIGURE 3. - Budapest Gameboard

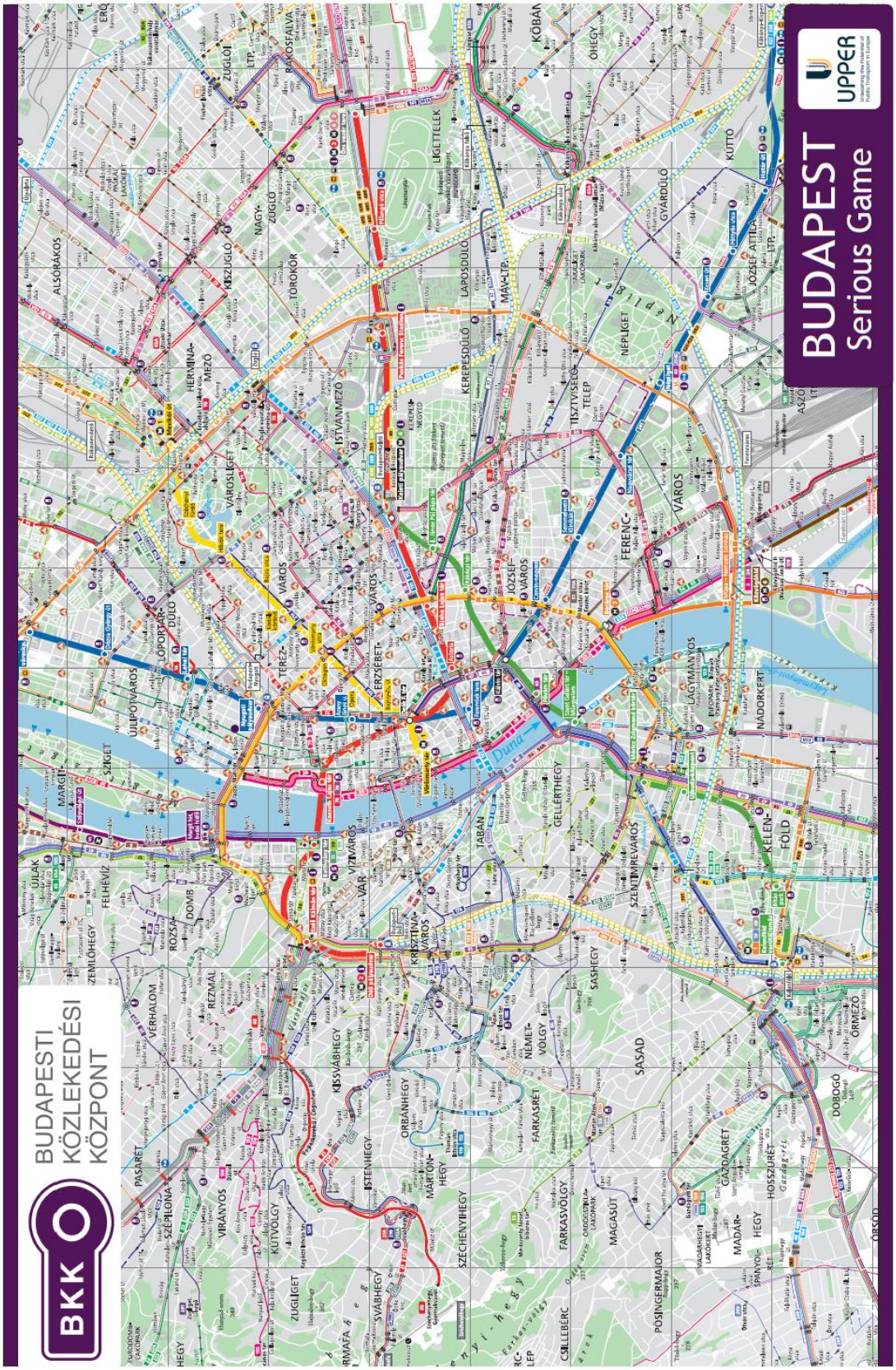
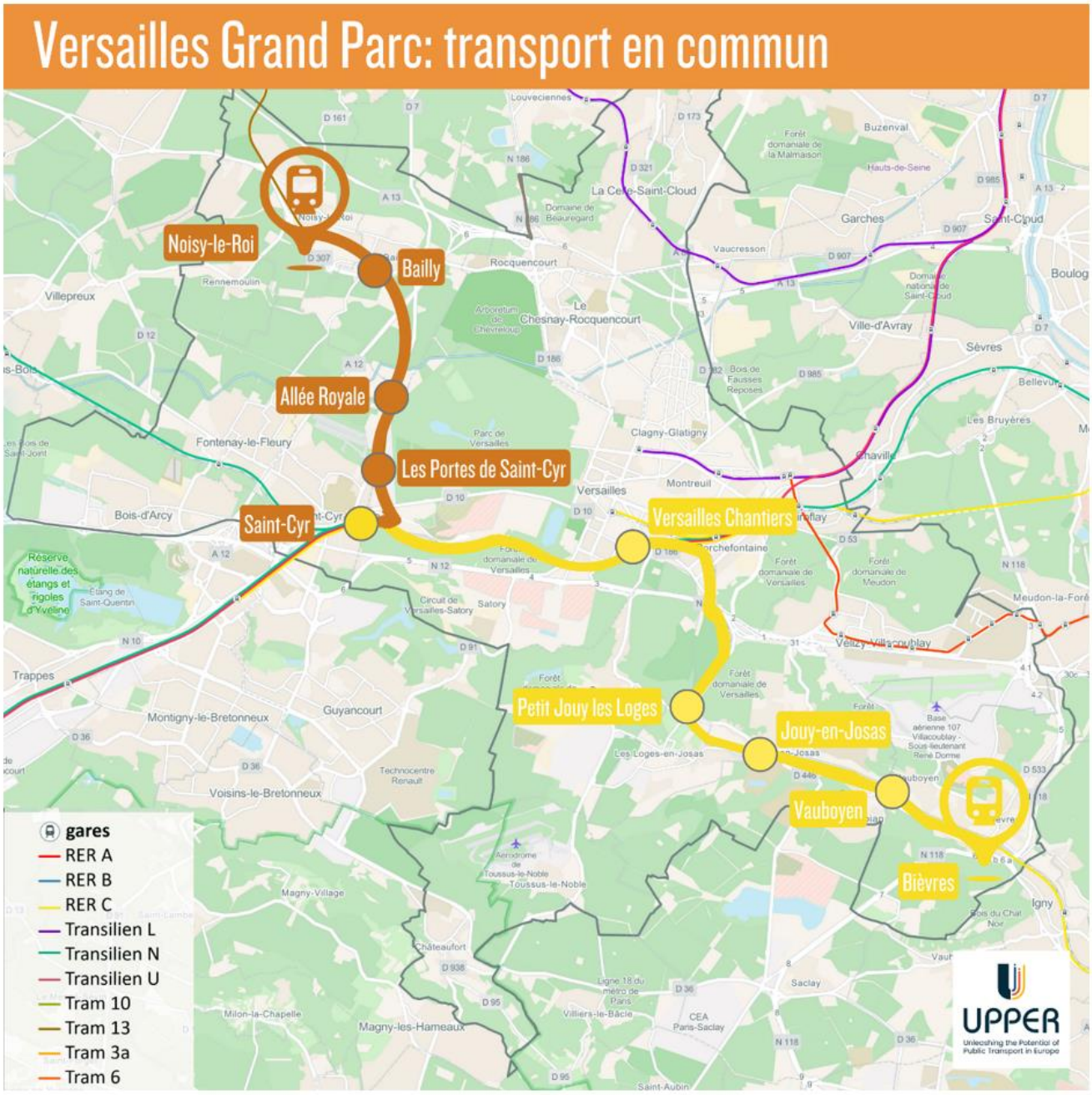


FIGURE 4. - Versailles Grand Parc Gameboard

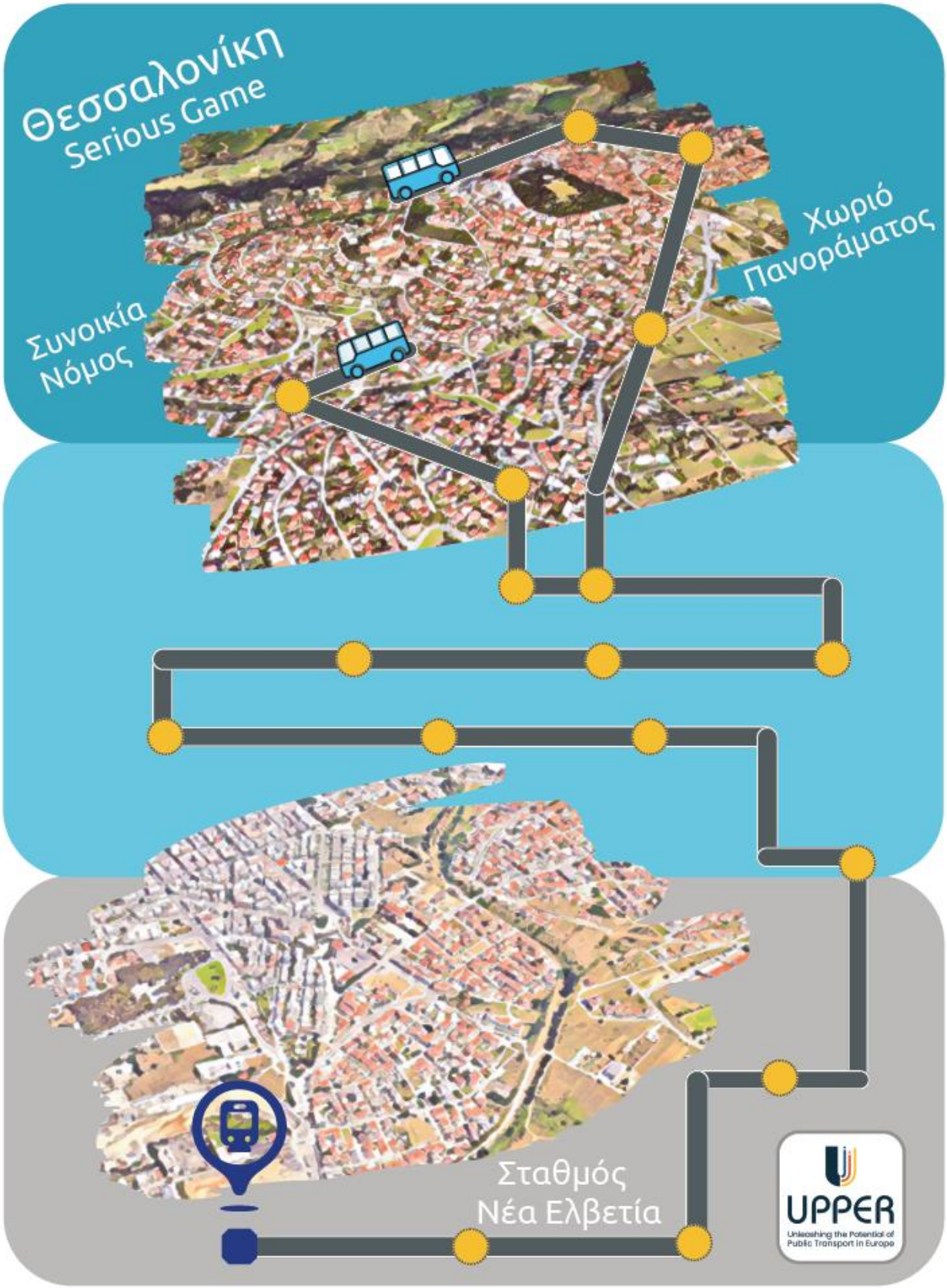


In the process of developing the gameboards, we also identified the need for more abstract boards because the focus of the game in some cities was on measures such as app development or a particular facility, such as public transport stop. Therefore, a map of the city or of a particular route would not necessarily trigger the type of discussion desired. The Hannover gameboard (Figure 5**Error! Reference source not found.**), designed by the Hannover team, showed some of the major destinations in Hannover. Similarly, the Oslo gameboard (Figure 6**Error! Reference source not found.**) highlighted the major destinations of the DRT system for the elderly, which was the focus of the game. The Thessaloniki gameboard (Figure 7) also focused on the DRT system in a particular area and had the objective of reaching the Nea Elvetia metro station, which will open during 2024.

FIGURE 5. - Hannover Gameboard

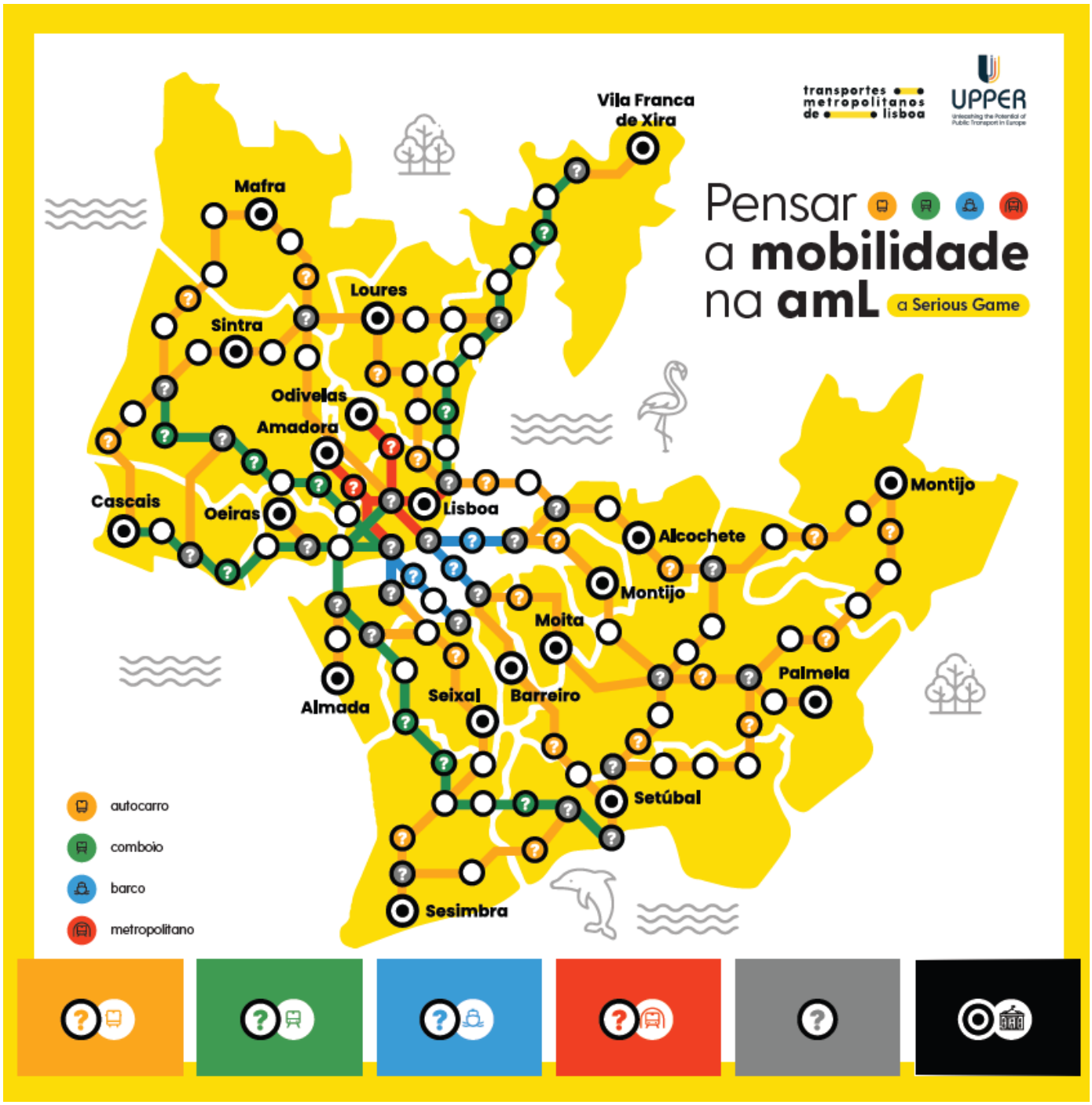
FIGURE 6. - Oslo Gameboard

FIGURE 7. - Thessaloniki Gameboard



The Lisbon Gameboard (Figure 8**Error! Reference source not found.**) developed by TML included many features, such as an abstract design which was based on transport connections within Lisbon metropolitan area. When individuals landed on different spaces, they could choose from different colour cards which corresponded to different transport modes. The design and premise of the game, as well as the visual design of the gameboard was engaging for users. Finally, the Mannheim gameboard (Picture 2) showed the location of the three transport stops discussed in the game. However, the approach was 3D and interactive with a large touch screen where (recently updated) Google Street view was used to look at the situation of the current stop. This was a creative approach to get effective feedback for the measure related to creating more attractive public transport stops.

FIGURE 8. - Lisbon Gameboard



PICTURE 2. - Mannheim Gameboard

3. Serious Game experience in UPPER sites

The following describes the serious games and results at each demo site. These are divided by the main topics addressed at each location: user information, demand responsive transit, public transport stops/interfaces, bike parking facility, and public space. Because the games were set up by a municipality or transport agency, the agencies were dealing directly with their customers. This presented important ethics and risk considerations. It was important for participants to know that the game is part of an ongoing effort to gather input on specific topics and would not necessarily mean all suggestions would be implemented. Data privacy was also an important consideration for participants. No personal (identifiable) information is included in any report related to the serious game. In any cases where audio recordings were used, the exact use of the audio recording after the game session was explained by the moderator to the participants and their permission was obtained.

3.1 User Information

Three of the cities within the UPPER project, Leuven, Versailles Grand Parc, and Valencia chose to look at measures where user information provision was a primary component.

3.1.1. LEUVEN

In Leuven, the game focused on improving user information, which is the goal of Measure 3&4. The challenges were developed to reflect unexpected situations where information is of the utmost importance, such as when a bus route has a temporary change, or a user must get to a new location for the first time. The map used for the gameboard was a map of the bus stops in the central area of Leuven.

The sessions took place in two different locations. The first session had a more informal approach; it was played at one of the moderator's homes. This was done to provide a familiar environment for some of the participants who would be very unlikely to participate in a typical public forum or local outreach event. The second event took place at the City of Leuven building.

PICTURE 3. - Leuven bus stop in the centre and at the central station

Main areas of convergent and divergent ideas: The game showed that there are both common and uncommon situations which pose a challenge for certain users. The frequency of route diversions can be challenging for many users, and notifications of route diversions or special events should be made in advance as well as during the time of the diversions. This can include app notifications or paper notices on the buses. There are more common problems, such as the difficulty for visually impaired users to locate where buses stop, specifically when several buses can stop at the same spot. This challenge might be experienced by visually impaired users in many locations and can be important in future station design. Also, the drivers are usually very helpful, but should not be the default solution to ask information, so they can focus on the driving. Also, the threshold to ask for help can be very high, e.g., for people with language disabilities, or autism. There needs to be a possibility to get information elsewhere, including a possibility to call for help.

Ideas for incorporation into measure: Make sure the communication with the driver is timely and accurate, and consistent with the information for users, certainly for special apps and tool used as aid for e.g., visually impaired. Take into account that combinations of physical and mental disabilities are very common, It is acceptable to work with a robot to provide help, but be sure to test user friendliness for all types of users, and have some easily accessible call option for people in trouble when taking public transport.

Considerations for the serious game method: Through the development of this game, it was revealed that greater attention should be given to how to adapt the game for individuals who are visually impaired. This includes a goal of adapting the game for future use by translating the challenges to braille and creating a more tactile game board. The location of the game session, the number of participants, and the pace of the game, need to be adapted to the needs of the participants.

3.1.2. VERSAILLES GRAND PARC

The Versailles Grand Parc (VGP) serious game focused on user information particularly for the RER C commuter train which connects the VGP area to the centre of Paris (related to IDF_01 and IDF_08). The RER C is a key route which can be confusing for regular users as well as visitors to the Versailles area. The concept of the game was to understand through which means – visual, digital, interactive, etc. – users would most like to receive information about the route during regular service and during service disruptions.

The game was carried out in two sessions at the office of the Communauté d'agglomération de Versailles Grand Parc. There were two moderators from the Institut de Paris Region and one from VGP to co-moderate and take notes. Three local people participated in the first session and four in the second session; all participants lived in different

parts of the VGP area, were different ages, and had different profiles. The game board was designed with the game objective to cross the territory of VGP, including using the RER C. The challenge cards were divided into four categories: before the trip, at the station/stop, during the trip, after the trip.

For each turn, participants could select a challenge from the category they preferred. The game continued with each participant selecting a challenge card, providing their solution, and opening for discussion with the entire group. A lot of discussion was generated with each question, as well as many follow-up questions from the moderators. The participants also were curious about the transportation system in general and reflected on many different aspects of the travel experience.

Main areas of convergent and divergent ideas: Multiple forms of information are needed. Participants felt the 'classic' travel information is essential, such as maps and timetables. The use of digital information should be to complement these forms of information. Real-time information is also essential. Having multiple real-time information channels appears essential: screens at stops, operator websites, applications, push systems that send information directly to the smartphone, etc. A particular note is that none of the participants were aware that a QR code is provided at each stop which links to real-time information. It would therefore be necessary to work on the promotion of this system.

There was a diversity of mobile applications used by the participants: SNCF Connect, Google, City Mapper, RATP…. The Ile-de-France Mobilités app was little used by participants. Several participants mentioned the need to centralise information in a single mobile application with, if possible, the integration of all modes of transport. MAAS was therefore naturally discussed. Additionally, announcements on board trains in the event of problems are considered too generic. They should be more detailed and educational.

Finally, having the presence of helpful staff was highly supported. Participants insisted on the multiple advantages of maintaining a human connection at the station: it provides security and also allows for detailed information when it is needed. However, some participants would like these agents at the station (or on board the trains) to be better trained. They find that their general knowledge of the system is sometimes too limited.

PICTURE 4. - Moderators and participants Versailles Grand Parc game

Ideas for incorporation into measures: In the short-term, the games made it clear that some level of information already exists and would most likely fill the need for real-time information, but the participants were not aware that this existed. For example, they did not know that there is real-time information available at each stop through QR codes. Promoting the existence of this feature could contribute to increasing the level of trust towards the PT network. This can enhance the user experience by providing a larger scope of information and therefore a better informed user. This feature can facilitate decision-making and allow for better trip management.

In the longer term, information and lessons from the game sessions will be passed on to the Regional Authority (Region Ile de France) and can, in the future, help identify some possibilities of improvement

Considerations for the serious game method: At times, the game can lead to a lot of general discussion about how the public transport system works. Game designers or moderators can decide to what extent they will discuss the broader questions of the transport system or focus on the specific issues listed in the challenge cards. However,

the focus should remain on obtaining participant input and recommendations. Additionally, two game sessions were carried out consecutively. With very talkative, active participants, it can be quite a lot of information for moderators and note-takers to assimilate. Thus, it could be better to host games on separate days or with a significant break in between.

3.1.3. VALENCIA

Valencia held game sessions on two different topics. One session addressed improving user information (VAL_07). The focus of the game was particularly on elderly with disabilities, as the participants in the game included one visually impaired elderly person and two hearing impaired elderly persons. The serious game took place at the Instituto Biomecánica de Valencia (IBV), which has extensive experience with public outreach and consultation. The challenges related to a variety of situations that might happen while using public transport where better user information is required.

PICTURE 5. - Valencia Serious Game session

Main areas of convergent or divergent ideas: Before the bus stop renovation, some of them were equipped with a button that provided information about upcoming buses through audio. The removal of these buttons during the bus stop renovation has been seen as a setback in accessibility. In general, users agree that it is important to provide information before the journey about both upcoming buses and incidents, alerts, or abnormal situations such as diversions or temporary changes in routes or stops. They agree that information should be provided through various means (at the stop's screens, through the app, on the website, etc.) as well as in various formats (both visual and audio to ensure it reaches all users). The use of the app, although increasingly widespread, is considered a necessary but not exclusive means, as older people are not accustomed to its use. Regarding onboard information during the journey, there is an emphasis on the need to provide information both visually and acoustically (ensuring that it is heard correctly) and to facilitate the understanding of the information by adding details that users may be familiar with (adding references to well-known monuments or buildings as a complement to the stop's name itself).

Ideas for incorporation into measure: The session has allowed for the identification of the information that users would like to receive both before and during the journey. Although much of the required information is already being provided (onboard through screens, at stops through screens and/or posters, and through digital media), there is an emphasis on the need to improve the way and means through which this information is provided. On one hand, there has been discussion about including a button at stops to receive "on-demand" information about upcoming buses through audio (complementing the visual information provided through the screens), as well as the inclusion of a speaker to provide real-time incident alerts (currently just notified through the APP). EMT must assess the feasibility of implementing these changes at stops, which would have an impact not only on measure VAL_07 (which deals with the provision of such information) but also on measure VAL_08 (related to the adaptation of bus stops). Another relevant issue refers to the need to be able to transform information into audio, for which it is necessary to provide information in text format, not just through images. These ideas will be taken into account when designing this measure.

3.2 Demand Responsive Transport

Two of the cities within the UPPER project, Oslo and Thessaloniki, chose to discuss measures related to providing a demand responsive transport service. Oslo's service is focused on the elderly, while Thessaloniki's service focused on suburban areas that are not adequately served by public transport.

3.2.1 OSLO

The serious game in Oslo focused on improving the Demand Responsive Transport (DRT) system for the elderly (OSL_05). The DRT service has been operating for a number of years, and Ruter has received feedback from customers through different channels. This was the first focus group-type discussion with users in a few years. Ruter used this opportunity to understand what challenges users may have with the app currently used to book the service, as there is a significant number of calls to the customer service centre related to bookings.

PICTURE 6. - Game site – Ruter Customer Service Center

The game session took place at the Ruter customer service office. There was one moderator and one notetaker from Ruter. First, the moderator gave a short introduction to the purpose of the game. The participants took the questions one by one, though they did not end up using the board as a game board. The first group consisted of women who were 65+ years old. All of the participants used the DRT service and did not have many major issues or challenges with using the system. Three of the participants were very comfortable with using the app, while one preferred not to use the app. Prior to the second session, it was determined that users who struggle with the app should be identified for participation and challenge cards should be adapted.

PICTURE 7. - First game session in Oslo

The second session took place at a senior centre with a group that was far less digitally inclined and had not tried booking trips through the app. All of them had smartphones (in addition to Doro phones, which are made for seniors), but they were primarily used for making calls or sending texts. App usage was low in general, and users preferred leaving their smartphones at home and used the Doro phone instead when running errands.

Main areas of convergent or divergent ideas: In the first session, there was an overall consensus that the app works well, and the interface for bookings, changes, and confirmations was easy to use. Generally, the users were satisfied with the app. If the participants had not downloaded the app on their own, they had relied on either a program called "digital grandmothers," provided at the senior centre, or close family for help. They felt comfortable to ask for help. Regarding learning how to use the app, they believed that human guidance, and being shown how to use the app, was far better than brochures and other printed materials.

In the second session, the participants had not tried booking trips through the app, despite having smartphones. The app design was not a barrier to use as much as lacking the motivation to use the app, especially since the phone booking system worked well. The leader at the health centre emphasized the importance of recognizing the diversity within the 67+ age group, where some are highly skilled in digital technology while others may never own a smartphone or know how to use one.

Ideas for incorporation into measure: By limiting bookings to the app, there is a risk of excluding a relatively large group of users from the service. A suggestion to increase the percentage of app-based bookings revolved around involving centres, institutions, networks, and official channels, such as doctor's offices, physical therapy centres, and city districts. Thus, the next steps would include investigating the need for allowing for certain telephone bookings. Additionally, shifting communication efforts on app bookings to target next of kins and institutions who can support seniors could be more effective that focusing on only the target group itself. Also, it will be important to look into digital booking solutions which allow senior centres and other support institutions to book on behalf of customers.

PICTURE 8. - Second Oslo session at a Senior Centre

Considerations for the serious game method: This session was organized with only two people moderating and taking notes. Additionally, the moderator acted only as a guide to the game, asking follow up questions where appropriate, but for the most part not adding comments to the discussion. This allowed participants to discuss the issues fully among themselves and provide their opinion. Also, though the game board was not used as a game board, it was a useful visual aid which could be used as a starting point for further explanation

3.2.2 THESSALONIKI

The serious game in Thessaloniki took place at the premises of the Hellenic Institute of Transport (HIT. The measure addressed focused on a demand responsive transport system (TES_07) which aims to serve suburban areas, and the challenges looked at many situations from weather implications to traveling with children. The session began with a short explanation of what the DRT system is and how it functions. There were twelve game participants, divided into two groups, with two games taking place simultaneously. The participants were very engaged and the game moved rapidly. Participants selected their challenge cards and provided solutions and quickly moved forward to the next question. In this case, there were many questions available which was useful for the type of game played. There were three co-moderators/note-takers from the project partners - THETA and CERTH/HIT - for each game and the president of the largest taxi association in Thessaloniki, who supported this DRT system.

Main areas of convergent or divergent ideas: Participants of both working sessions welcomed the idea of a new DRT service as it would increase access to public transport for the area. Their ideas were convergent, contributing to the best design of the service. They all agreed that the drivers and staff involved in the service should be properly trained and always be ready to face unexpected situations. Also, the places from where users will be collected by the vehicle should be carefully selected in suitable areas, thus ensuring safety, comfort and convenience.

Vehicles must have high standards and be appropriate for all types of users, especially the vulnerable ones. Free space for luggage, strollers and other personal items must be available in every vehicle. Also, special car seats for infants/toddlers should also be available upon request for young passengers. Finally, air-conditioning for extreme

temperature conditions and information screens inside vehicles are considered necessary to create a comfortable transport environment.

Furthermore, all participants agreed that application of the service should provide real-time information to users about unexpected events, different routes, timetables of other PT modes and weather conditions. Participants in both sessions agreed that in order to attract many users, waiting time should be minimized and the estimated time of arrival should be adhered to. The booking of the service should allow for a degree of flexibility. They also noted that a large number of users may lead to increased travel times, which must be addressed with a larger fleet of vehicles.

PICTURE 9. - Thessaloniki Game Sessions

Ideas for incorporation into measure: The new ideas in the working sessions, besides the ideas that were discussed related to the challenge cards, were about the app for the DRT service. In the first working session participants indicated that the app could show current traffic conditions in order for the users to be aware and avoid surprises. In the second working session participants indicated that users should have the opportunity to cancel a scheduled DRT reservation, even last-minute cancellations. However, the application should warn users with a message notification that there will be a penalty after a certain number of cancellations. The results of the two sessions also indicate that a synergy between the DRT app and the digital service that will be developed in the framework of TES_01 for facilitating intermodality and use of public transport would be very useful for the users.

Considerations for the serious game method: The game in Thessaloniki was very dynamic, where participants gave answers quickly and moved on to the next question. However, on certain topics there was a lot of discussion among the group and with observers, and participants were very engaged. If game designers would like to create this type of game which moves more quickly, it is important to develop many questions, since each question might only require one to two minutes for discussion. Moderators should also be mindful of when a short discussion on the topic makes sense or when further follow-up questions should be asked.

3.3 Inclusive Public Transport Stops and Interfaces

Three of the cities within the UPPER project, Valencia, Mannheim, and Lisbon, chose to look at measures related to improving public transport stops, stations, and the surrounding area.

3.3.1 VALENCIA

The first session of the serious game in Valencia addressed creating a more inclusive bus stop (VAL_08). Many of the bus stops have recently been upgraded to include benches and more shade. EMT also has a consultation process with a group of vulnerable road users to aid in creating more inclusive design. With a desire to continue improving in this area, Valencia aims to create a more inclusive bus stop through the UPPER project. The challenges related to a variety of situations that might happen while one is at a public transport stop, from weather to safety.

The serious game took place at the Instituto Biomecánica de Valencia (IBV). The session consisted of three players of different ages and very different challenges related to public transportation. During the game, each person took turns rolling the dice, selecting challenge cards, and responding to the cards.

Main areas of convergent or divergent ideas: The participants discussed the design of the bus stop itself noting the need for increased shaded area around and within the bus stop, especially during peak hours. It was also proposed to design the stop according to the usual volume of passengers at that specific stop. Also, some stops could be moved a few meters and be in a shaded area. Physical design of the bus stop was also mentioned in terms of safety. For example, bike lanes that come between a bus stop and the bus do not feel safe when cyclists pass without looking. The surfaces at a bus stop can also be slippery for people using wheel chairs, and a non-slip type of surface should be used.

PICTURE 10. - Valencia Game related to PT stops

The need for visual and audio information was also discussed, particularly when there are delays or incidents, and the need for improved screens. Teleassistance buttons at bus stops should be available, enabling individuals to easily contact the EMT control system for various purposes: including assistance with ticketing, bus route inquiries, and other non-urgent matters, distinct from the emergency button meant for dangerous situations.

Regarding ticketing, it should be possible to pay with different methods (card, mobile, cash, etc.). They also discussed ticketing, specifically that being able to check-in prior to boarding the bus is beneficial for many, since it can be difficult to swipe tickets for many different users (i.e. holding a cane, using a wheel chair, pushing a pram). Checking-in before boarding the bus could speed up boarding and also allow users to use any door to board. Additionally, it could be useful to distribute different users along the bus doors before boarding, with marked entry areas for wheels chairs or those with luggage, etc.

Generally, the drivers should be more understanding and patient with users who have different needs. Some individuals may find it difficult to raise their hand to signal the bus to stop. Those in wheelchairs may also need better accommodations on-board the bus.

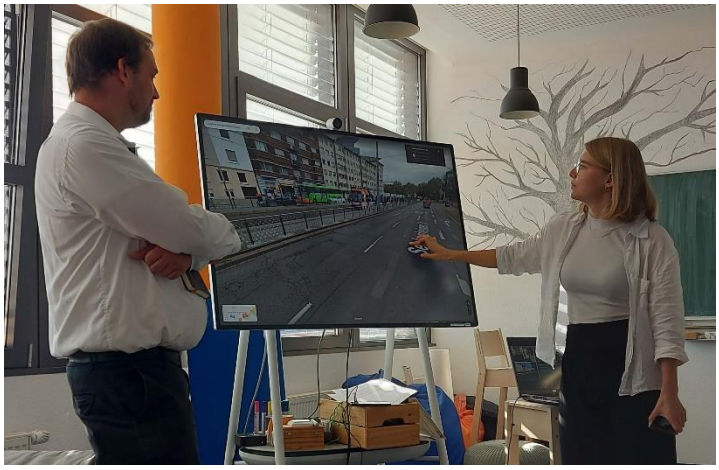
Ideas for incorporation into measure: Taking into consideration that EMT has recently renovated the majority of its bus stops, EMT must carefully evaluate the viability and the benefits of the proposed changes and new functionalities discussed during the session. The implementation of a Bus Rapid Transit system (BRT) on Blasco Ibáñez (VAL_04) requires the adaptation of its stops, including the incorporation of a ticketing system at the bus stop itself. EMT will leverage this opportunity to introduce some of the additional proposed features, including not only those related to ticketing but especially those related to accessibility (mental and physically) and the security perception (especially at night).

Considerations for the serious game method: Many questions came up during the meeting, especially regarding the meaning of certain terms, such as BRT. Having a presentation in advance of playing the game can help to focus participants on certain aspects of the transport system where the policy makers are particularly looking for input.

3.3.2 MANNHEIM

In Mannheim measure MAN_04 deals with the design of an attractive, accessible, secure, comfortable, multifunctional and clean public transport stop. Therefore, the focus on the serious game was to improve public transport stops. To carry out the game, the team focused on three stops that most participants would have visited in the city and whereby features in the design of those specific PT stops can be transferred to other PT stops as well. The concept of the game was to travel to different stops, and at each stop there would be a challenge for each participant. The challenges related to each of the goals of the measure (accessible, secure, etc.). This included many visuals of the different locations as well as a touch screen which allowed players to look at details of different aspects of the transport stops.

PICTURE 11. - Reviewing transport stops with a touch screen



The game sessions took place at rnv (Rhein-Neckar-Verkehr) headquarters and participants represented different ages and backgrounds. Both game sessions took place in the morning and lasted about one hour and half each. In the second session, a local representative as well as representative from the Baden-Württemberg region joined the game session. Having policy-makers or officials participate in the serious game has also been done in the past and can be helpful for translating user experiences to policy makers.

Main areas of convergent or divergent ideas:

- Digital passenger information must be easily visible and should also be available (in specific cases) inside buildings such as the National Theatre. The rail replacement service could also be displayed in the building on the screen of the digital passenger information, as well as the corresponding direction of travel.
- Traffic lights should not have long waiting times at PT stops where passengers must cross a street in order to get to the bus or tram stop (for example, when stops are located in the centre lanes of the street).
- The entrance area at the stop where access to the tram is easier and provides more space should be marked accordingly.
- The PT stop environment is very important for passengers' comfort and sense of security. Bakers, kiosks and a lively environment have a positive effect on the passengers' feeling of safety and comfort.
- The greening of PT stops is defined as one of the most important cross-aspect measures. Furthermore, cleanliness is defined as the least important aspect.
- An insight that resonated with games in other cities was the placement of bike lanes in relation to the shelter at the stop. In some locations, in order to board the tram from the bench and shelter at the stop, users would need to cross a bike lane. While this can be manageable for some users, it may provide a major difficulty for many.

Ideas for incorporation into measure: While the game was only focused on one measure, it demonstrated ideas for incorporation into two measures. For Measure MAN_01, which also addresses the mobility needs of passengers,

PICTURE 12. - Mannheim participants discussing transport stops

the results can provide evidence for further questions and revisit aspects such as safety and accessibility. For Measure MAN_04, it is important to improve the perception of digital services at PT stops and thus increase comfort and multifunctionality. Regarding adapting PT stops and public transport infrastructure to climate change, e.g., greening and shading to reduce direct sunlight and heat in summer or unsealing formerly paved areas to cope with heavy rainfall, this should pay particular attention to the aspect of comfort and bring specific improvements, such as shade or cooling. Regarding the development of a comprehensive platform with construction standards for all future rnv construction projects. This can accelerate the planning and construction processes while increasing best practices in accessibility, comfort and multifunctionality.

Considerations for the serious game method: The use of extensive visuals, particularly for understanding the public transport stops, was extremely helpful in generating discussions. The idea of the serious game is not only to look at major changes that need to be made in a public transport system but also small details which can provide a big difference for users. With these visuals, participants could point to specific challenges, such as locations of railing or crosswalks in inconvenient locations.

3.3.3 LISBON

The game in Lisbon took place at a Transportes Metropolitanos de Lisboa (TML) office near Santa Apolonia train station. The game was developed to consider a combination of user information and multi-modal transportation (LIS_06). Challenges were developed for five different categories: bus, train, boat, public space, and interfaces. Many challenges were created to cover many different situations. To start the game, each player selected a location card which indicated where they would start for the game. The idea of the game is that the players were family members which were each trying to reach the centre of Lisbon for their cousin Maria's birthday party. There was one main moderator of the game, with additional note-takers and observers from TML, including some who joined online.

The sessions allowed ample time for participants to arrive, meet the other game participants and observers, and discuss the game concept and instructions. The group included people with a variety of different abilities and disabilities, each with people who supported them. Because some people needed to work through a translator it was important to have this informal opening time to make sure each person knew what the game entailed and the type of discussion we would have. Two sessions were completed in one day, one in the morning and one in the evening, with five participants in each session.

Main areas of convergent or divergent ideas: A subject that came up during these sessions that related to other cities was staff training. The participants said public transport workers should be trained to consider various possibilities in their contact with users; and for example, deaf people, or those with developmental challenges, may not be visibly disabled, but may not respond to instructions or information when they are addressed. In general, it was suggested that people must have a positive attitude towards people with disabilities. There should be special training for drivers to deal with differences. There were also many discussions related to physical challenges in the

infrastructure, particularly at stations, where there may not be good information for visually-impaired individuals, and thus they rely on others for help. It is important to have simulation activities with people who have all types of disabilities, on a trip or in an interface, pointing out the concrete cases that pose difficulties. It is important to have an avenue to report the problems so that they can be resolved.

PICTURE 13. - Lisbon gameboard and challenge cards

Considerations for the serious game method: A question arose of whether it is useful for participants to imagine the situations of other users which may not apply to them (such as riding a bicycle, which might not be possible for a particular user), or if it is better to focus on reflecting their own experience as a user. There is not a requirement to focus on one approach or another; however, game designers can consider whether they would like "role-playing"-type challenges or if the challenges should be generalized so that any user who selects the challenge (visually-impaired or deaf, etc.) could address the question from their experience.

The game can generate a lot of discussion about related challenges. Creating an informal atmosphere before and after the game which allows for additional discussion and reflection can also be helpful for further understanding challenges and potential solutions. In addition, ensuring the right support for each participant during the game can be important for some individuals. Also, different types of participants may need more or less explanation of how the game works, and time for this should be considered.

3.4 Inclusive bike tower parking

The Region of Hannover chose to focus on a measure concerning a new bike tower at one of the popular regional train stations.

3.4.1 HANNOVER

In Hannover, the serious game addressed ways to make a new bike tower, part of HAN_03, more inclusive and user-friendly. The bike tower is a new type of bike parking structure where users can drop off their bike, then the tower uses a lift to store bikes vertically (Picture 8). It is currently in a testing phase and will become operational in October 2023. The bike tower was installed at a train station in Wunstorf in the Hannover region with a connection to the city of Hannover. The station currently has a large amount of bike parking, however, there is still a waiting list of over 200 people for secure bike parking. This makes the location of the new bike tower ideal for serving public demand.

The serious game began with a short tour demonstrating how to use operate the bike tower, giving some participants an opportunity to try parking their bike in the tower. The explanation was thorough, answering many questions individuals had about how the tower operates. This was seen as a necessary step, since the tower is new and none of the participants would have used the bike tower prior to this meeting.

After the tour, the serious game was played in a nearby community centre. Participants were able to select a challenge card, and in this case, the moderator read the card for the whole group. Participants were given an opportunity to respond before it was opened to the whole group. The note taker made short notes which were posted on the wall as a reminder of what had been discussed. There was quite a lot of positive interest in participating in the game. The first game consisted of five participants and the second game consisted of ten participants. People who joined the games came from many backgrounds, including from local groups that support individuals with disabilities.

PICTURE 14. - Tour of bike tower

Main areas of convergent or divergent ideas: It is interesting to note that in both game sessions the lack of toilets at the station was mentioned; thus, this seems to be an important issue. Another important point is the services around the bike tower. An emergency hotline that can be called in case of a technical malfunction was mentioned in both sessions. The design of the sign with the description of its function was also mentioned more often. It is important that it is designed in easy language and is understandable. There should also be an explanatory film that shows how the tower works.

In contrast to the first session, during the second session, the perception of safety appeared to be an issue. Camera monitoring of the bike tower was only mentioned in the second session, as well as alternatives to the lift. In the second session, it was also mentioned that the lift at the station is much too small to take certain types of bikes –which was not a topic of discussion in the first session.

PICTURE 15. - Hannover gameboard, challenge cards, and self-made game stone

In summary, we could say that different groups of people in different life circumstances have different needs and wishes concerning the bike tower and the railway station. We were already aware of this in advance for the serious game, but the planning game made it even clearer.

Ideas for incorporation into measure: Some of the improvements mentioned in the game sessions have already been initiated for the bike tower. These include, for example, the design of the sign in easy language and the explanatory video. Further improvements based on the suggestions from the serious game have been taken up and will be implemented if possible.

PICTURE 16. - Participants in Hannover game

Considerations for the serious game method: The game was useful from the planning perspective to help develop awareness of the needs of different types of users. Additionally, the different size groups made a noticeable difference in responses. Within the smaller group, all participants were able to give their opinion to all and discussion different items more in-depth. In the larger group, different ideas came up, though each participant was not able to speak as long. The tour made the game very interactive and was useful in engaging the group in further discussion.

3.5 User Satisfaction and Service Levels

Budapest chose to focus on a measure (BUD_03) which aims to understand user satisfaction in comparison to public transport service levels.

3.5.1 BUDAPEST

PICTURE 17. - Budapest game map overlayed on large transport map

The sessions took place in the BKK office. The moderators were from the customer service department, who had experience in many types of interviews and focus groups for understanding user needs. In addition to the participants, there was one main moderator and a co-moderator who was also taking notes. A camera was set up in the room which allowed colleagues in another room to watch and listen to the discussion without perhaps having influence on the answers of the participants. An audio recording was made of each session, which would be deleted after the notes were finalized for both sessions. Because of the recordings being made, participants signed a release form.

There were six participants in each session of different ages and with different transport habits. The game took place in the early evening on a weekday to accommodate participant schedules. The first 30 minutes of the session involved each participant describing their typical trajectories in the city and some typical challenges they might encounter

along the way. After that, each participant selected a challenge card, which addressed common but difficult challenges which typically arise when traveling around the city.

PICTURE 18. - Budapest participant discussing his trajectory

As with other games, each participant had an opportunity to answer their challenge, which was followed by a discussion of the challenge from other players. The moderators kept a good pace during the session and kept the participants engaged.

Ideas for incorporation into measure: Some decision-making mechanisms were found, which require further research, these can also be supplemented, for example: what influences people owning their own car or what does it depend on if someone uses a shared scooter? If shared scooters are spontaneously available somewhere, does this also replace public transport between certain points when the trip was not consciously planned in advance? A related question is: does anyone use shared scooters consciously, or planned in advance, and use them essentially as a replacement for other transport modes?

PICTURE 19. - Budapest challenge cards

Considerations for the serious game method: The participants in these games were from a group of more standard users, not necessarily groups with particular difficulties using the transportation system. However, this made sense in relation to the measure that was being assessed. The game board was a public transport route map for the city of Budapest. This was beneficial because participants could point to the locations where they typically travelled throughout the day, and the visual helped to create a common understanding of what different players were highlighting. The challenge cards also generated a lot of discussion, and it is a useful way to ensure different people participate. Overall, while the game has typically been targeted to vulnerable users, there are

some aspects of the game that are also useful for discussions with all types of participants. Additionally, this game showed again that a moderator with some experience with moderating can help to get a lot of feedback from participants. A final note, in Budapest, as in many cities, small gifts or vouchers were offered to show appreciation for the individuals who participated.

3.6 Urban Space Design

Rome chose to focus on designing safer urban spaces.

3.6.1 ROME

Rome has a measure which is focused on improving urban space design (ROM_08). There are many changes to road system foreseen, including pedestrianisation and redevelopment of streets. One goal is to improve road safety through these changes, in part through getting input from different stakeholders. For the serious game, Roma Servizi Per La Mobilita (RSM) contacted the “Casal Bertone” Senior Centre. The neighbourhood called “Casal Bertone”, is quite close to an important transport node (Tiburtina Station) and has recently been subject to road space reorganisation, to implement the “30 zones” in some sensitive areas. The objective was to gain insight from elderly people about the problems there are in moving around their neighbourhood.

PICTURE 20. - Participants at Rome Serious Game

Fifteen people attended and the session lasted one and a half hours. The meeting was facilitated by three professionals of the mobility agency who also took notes and pictures. A map of the borough was used to facilitate the discussion, and challenge cards provided ideas to animate the debate. The participants were very engaged in the discussion.

The participants mostly travelled by foot for their daily trips to the market or senior centre. The discussion touched on many different aspects, and participants felt like their neighbourhood suffered significantly from mobility problems, which also affect the whole city.

Main areas of convergent or divergent ideas: Some of the issues pointed out was the lack of a smooth sidewalk which makes walking difficult. There were also limited pedestrian crossings and ramps for disabled people. The participants noted as a positive development that the new “30 zones” have taken space from private motorised traffic. Also, the new “Portonacio” bus priority lane has increased the speed of PT. However, those who used cars found it less convenient having to take a longer route because of the priority lanes. They all agreed on the need of control and presence of the public authorities in the territory to guarantee safety, clean roads and legality (double parking, speed control etc).

This group noted that the because of changes to the PT network, they needed to walk further to reach PT stops. Often, when taking the bus to the city centre, changing buses was required which makes journeys more complex. This group preferred to have traditional options for information and ticketing. They all preferred to buy tickets at the

tobacconist and to ask the bus driver for information when needed. Though there was awareness of online information, they did not take advantage of it.

PICTURE 21. - Participants at Rome Serious Game

Ideas for incorporation into measure: Generally, participants wanted more and safer pedestrian routes to reach PT. There was also more attention required for the needs of people with mobility impairments. This includes better pavement and dedicated spaces, but also wanting other citizens to respect the rules of the road.

A longer term point to consider, not only for this measure, is that it is important for public transport services to be tailored to the needs of people, rather than mainly focusing on efficiency standards. This can be reflected also in other aspects of the public services (urban police, garbage collection services, public green, etc.).

Considerations for the serious game method: The session did not need facilitation, as the mobility matter was very important to participants. Only one challenge card was needed to kick-off the discussion. As this happened in other UPPER sites as well, it can highlight an important point of which situations will get the better results by using the serious game method and which might get better results from other qualitative approaches.

4. Summary of UPPER Serious Games

The results relate to both concerns addressed, and solutions provided for the UPPER measures as well as practical considerations for adapting the game for different purposes and different cities.

4.1 Challenges and Solutions

There were common issues that arose in many of the discussions which ranged from general challenges to very specific concerns. Some of these suggestions can be directly implemented by local agencies while other suggestions may require further study and participation from individuals in different disciplines:

Routes Deviations: There were many challenges related to bus deviations from standard routes. In general, participants suggested that this should be avoided as much as possible. However, when deviations happen, passengers should be informed through a variety of means (signs on buses, at stops, through apps, or SMS). Also, if some route changes are known in advance, they should be communicated to passengers in advance. It is important to let passengers know the exact deviation, not only the starting and ending point of the line, as well as the new

arrival time so that passengers can make new arrangements in case they will be late for work or miss appointments or activities.

Informed and helpful staff: Another issue that came up many times is that of staff and/or driver training. Participants noted that sometimes staff or drivers are not informed about important information, such as route changes or deviations that may be coming in advance. Also, given that many types of users rely on public transport, staff and drivers do not always come across as attentive to the needs of vulnerable groups who may need a particular type of assistance. It was suggested that better training be given to staff and drivers so they will have more understanding of how to accommodate people with different disabilities, including those who may not appear to have a disability. Also, there are times where passengers might expect to find in-person support to answer questions, often at stations, yet the station help desk is always closed.

A related solution focuses not only on the staff of the public transport agencies, but staff in other organisations and institutions that support specific groups such as the elderly. These organisations can be given information about public transport options for the elderly, and the organisation can then provide this information to the individuals they support.

Multiple channels of information: The need for multiple channels of information was highlighted many times. This can include visual, tactile, and audible forms of information, which use simple and easy-to-understand language. When one channel is not working, or is not of good quality, other channels can be used. These channels can address specific disabilities and can be helpful for a variety of users as well. A related issue that was mentioned in more than one city is that screens with real-time information at bus stops are often not visible due to the sun, showing it is also important to check that the multiple channels of information function as intended. There can be a challenge to provide multiple channels of information effectively, ensuring that all channels be reliable and up-to-date. An idea to consider, that was only briefly touched on in these games, is that it is possible for passengers to receive too many notifications.

Consistent information 'network' for those with disabilities, especially during an emergency: It is important to consider the gaps in the information network for people with different types of disabilities. While information about particular routes or stops might be available in general (such as on a website or with an app), at specific critical locations, like stations or bus stops with multiple lines, there can be a lack of clear information about which stop to go to, or the information only comes through one channel. Similarly, when there are emergencies, such as the metro train stopping for a long period of time, typically the announcements on-board are only audio, and a deaf person or someone who does not speak the language, for example, might not have a way to understand the situation. In addition, many participants noted the need for better and more complete information during emergencies.

Digital Divide varies: Many individuals – including elderly, kids, visually-impaired, deaf, etc. – rely on mobility apps to help them know how to move around the city. Some of these apps have specific functions that make mobility easier for people with different informational needs. This suggests that digital literacy is high for some and is an important enabler of multi-modal transport. This also shows that good practices already exist in designing apps that meet a variety of needs. However, with elderly groups there is less uniformity in digital literacy; some users are very comfortable with digital information and others either will not use digital sources of information or have a strong preference for traditional sources.

Correct real time information: The importance of real-time information was often noted; however, participants also shared that real-time information is often incorrect or only partially available. It is important for users to know what the concept of 'real-time' information means in order to understand how reliable it is.

Improved maps and naming of stops and routes: Many suggestions were made about how to improve maps. Having physical and tactile maps at stations, including, but not only, for visually-impaired, can help provide information for users about different transport options and destinations one can reach from the station. It is also important to create maps that rely on more than colour palettes as guides and effectively use numbers and symbols. A similar idea was to improve the names of stops and routes so they reflected the main destinations that could be reach on a route or near to a stop.

Concerns about digital ticketing: It is unclear how often this situation arises, however many people feel uncomfortable with digital ticketing when considering the possibility that their cell phone battery runs out or they lose

data access. It seems that transport providers should provide a clear protocol to users for what would happen if they want to board a bus, or have a ticket inspection, but they no longer have access to their digital ticket. A type of back-up system could also be created, perhaps with a user ID, to have another means of accessing digital tickets.

Physical design of stops and urban space: There were many issues related to design of space, including materials used in different locations. While specific instances of design issues were discussed, these could point to more important principles to incorporate into planning or design. Some examples follow:

- A surprising commonality in many cities is that there are locations where a bike lane comes between a bus shelter and the street where the bus stops. This requires people waiting at the bus shelter to cross a bike lane in order to board the bus or passengers alighting to step into a bike lane. This can create a difficult and dangerous situation for many transport passengers as well as cyclists.
- One blind participant stated he could not feel the difference in the pavement with his walking cane between some bike lanes and sidewalks. Therefore, having a distinctive surface that designates a bike lane can be useful for the visually-impaired and most likely for cyclists as well.
- Slippery surfaces around bus stops, in stations, and on ramps were noted by participants as dangerous, particularly for those with difficulty walking or using wheel chairs. They noted that not all ramp designs are useful. There are locations with existing good practices related to materials and ramp design for stops and stations which could be used as a reference for other cities.
- Also, traffic signal timing can be improved around PT stops where crossing a street is required to reach the PT stop.
- In general, design for all stops, from small stops to large stations, could be improved to accommodate different types of users in a safe way.

Safety: The issue of safety was mentioned in the challenge cards, and participants often agreed that safety was important. Design of stops, lighting, and correct route information (to make sure individuals got on the correct bus) were mentioned with regards to safety. Many agreed with having some sort of emergency service and SOS buttons at different bus stops. These could also be used to contact a control centre. However, agencies might need to consider how to ensure these emergency buttons would be used for the right purposes. Also, having staff present in locations such as stations or available by call at bus stops would improve feelings of security among passengers.

4.2 Practical considerations for using and adapting the serious game

Overall, the successful experiences in different UPPER demo sites shows that the game format can be adapted to obtain feedback about many different types of measures and many different cultural contexts. The concept of each user getting a question which they can first respond to before getting opinions from others is helpful to make sure that all voices are heard. While there are no specific rules for how the game is set up, here are some points to consider for developing a game:

Moderation: Ideally, the moderator should have some general guidelines on how to moderate the session, though moderators act as a participant-observer and are not restricted from giving their views. Having two or three co-moderators/notetakers seems to generate the most in-depth discussion. Having additional notetakers can also be beneficial to make sure important details are not missed, especially if there will not be an audio recording. It is important to note that sometimes moderating is quite easy, and participants easily share their views. Other times, the moderation can be a bit more difficult, and therefore, someone with experience or an inclination for moderating the session is helpful.

Observers and guests: Often many people are interested to take notes or listen to the discussion of participants. It is useful to consider how many people will be in the room. There is a possibility to create a 'fish-bowl' effect, which could impact how participants answer the questions. However, participants seemed to speak quite freely in the UPPER games even in cases with many observers. Also, with many observers in the room, it is also possible that the game becomes more like a group discussion, veering into broader discussions about the transport system. The composition of guests could also be important, as there can be pros and cons to having many experts jumping into the discussion if they are present. Experts may be able to give answers to questions that users have about the transport system, which can be very informative, though it might change the goal of the session. Moderators and game designers should be mindful of these dynamics when developing the game and proceed with the approach that seems best for gaining their desired feedback. It is also possible for cities to try different types of games to see if the input differs (as noted in Hannover). Additionally, if more people would like to listen to the conversation, having a video connection can allow for this without observers influencing the participants (as in Budapest).

Tempo of the game: Related to moderation, game designers can choose the tempo of the game in advance. There can be a slower game where 4 to 6 participants will receive 2 or 3 questions, and take up to 5 minutes to discuss each question. In these cases, the game may last between 45 minutes and 1.5 hours. There is also the possibility to have more questions and only spend 1 to 2 minutes per question. In these cases 4 or 5 challenges might be needed per participant. Moderators can also decide in advance how long they would like to spend on each question, which can reflect the specific needs of the selected participants. The game format is meant to emphasize this idea: if there is a quick and simple solution for a question, it is okay to move on quickly to the next challenge, if an interesting discussion evolves from the question, it is okay to stay on the topic for a longer time. Also, the moderator can use the game format as a tool to help with moderation if the discussion continues to go far off topic or if there is one dominant speaker.

Participant group and number of participants: For this type of game, groups with mixed backgrounds and abilities has been shown to produce the most interesting results, since what is useful for one individual may not be useful for another. This also seemed to be the case with the UPPER games where mixed groups relayed a variety of experiences and possible solutions. In selecting participants, it is also important to avoid standard "personas" for inclusiveness and consider including individuals with many types of challenges. Another important note is that if there are more than 6 participants, the 'game' part of the method will not work, as many participants might not get an opportunity to answer a question.

Location: Many of the UPPER games were performed at the headquarters of the public transport provider, which allowed for easy access to rooms and materials. It is also possible to consider different locations, which might be less formal, like a community centre, and could help to reach certain groups. Also, site visits, such as in the bike tower game, were fundamental to getting successful input from participants.

Creating tools: In developing the gameboards, challenges, visuals, and presentation, it is good to be creative and create engaging materials. Some particularly interesting challenges elicited new responses and ideas. Some visuals generated a lot of discussion. This is an opportunity for game designers, who may be researchers, planners, or engineers, to think about the public transport system in a different way. However, it is also important to not underestimate the time that may be required for the practical side of developing visuals, maps, and gameboards. There are also many details that can be considered, such as the size of the challenge cards and the font of the text, so that players can easily manipulate cards and read the text on the maps and cards.

4.3 Conclusions and Next Steps

The serious game method has become a way for cities to collect challenges encountered by vulnerable users in real life and to co-create a list of challenges and of solutions among cities and public transport providers. This task showed that in creating a game to address users' needs, demo site partners also had an opportunity to use creative approaches to understand and elicit feedback from the local citizens, with inspiring variants adapted to different urban environments and public transport measures. It also showed the importance of providing visuals and other materials which prompted participants to share many experiences in using public transport.

The participants can be a good source of information to understand what is already working well and what can be improved. Participants often knew of existing solutions to certain problems or ideas they had seen used in other cities. Similarly, some participants mentioned existing laws or guidelines, such as those related to colour use for colourblind people, which would be beneficial when applied to transport system informational guidelines. In general, laws and guidelines related to different aspects of the transport system exist in some cities and not in others, and this creates an opportunity to share best practices.

For the UPPER project, the next step will be to begin incorporating some of these ideas into measures, and in some cases the demo sites have begun this process already. This particularly relates to improving ticketing, apps, and information. However, as is clear from the list above, not all of these issues can be easily addressed by local transport agencies. Some of the suggestions which relate to improved map designs or station designs for all users could be addressed through urban designers, materials designers, and mapping or wayfinding specialists.

A further possibility for the serious game is to continue working with different types of users. Some possible participants include school children, people who have disabilities which may be 'invisible', or people who do not use public transport because of a specific barrier. There is also the possibility to adapt the game format to reach additional groups. After this report is completed, the UPPER serious game results will be distributed through an open data repository, to provide information for other cities on how to make public transport and cities more inclusive.

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Annex: Serious Game results

This annex includes the results of each game by city. Each city identifies the selected measure, the game objective, the designed challenges (including the situation and question proposed as well as which group they are targeted to). Then for each session we identify the date and location and a short description of the participants. Each summary takes a slightly different format based on what was most useful for the demo site, which includes the challenges selected during the game, the ideas discussed, and the solutions identified.

A.1 Leuven

Measure: LEU_03_04 “To increase visibility and ease of use of public transport by offering improved information on public transport, parking and shared mobility options.”

Game Objective: To increase visibility and use of public transport by offering improved information on public transport, parking and shared mobility options

A.1.1 LEUVEN GAME SESSIONS

Session 1

Date and Location: 20/07/2023. Int-Joris-Winge

Number of participants: 4

Target groups represented:

- man 70+, deaf on one side, difficulty walking since a few weeks due to knee problems. Live outside Leuven, frequently takes the bus to Leuven

- woman 40+, speaks Dutch with a French accent, lives in Leuven almost daily

- woman, 20+, lives in Leuven, autism, takes the bus + train to sheltered workshop daily

- woman, 60+, lives in suburb of Leuven, has a mentally handicapped adult son, usually cycles to Leuven but takes the bus when it rains

Challenges discussed: The formulation of the challenges was slightly modified with the translation; below is the literal translation

1. It’s Open Monument Day. You have a reservation to visit the restauration of the Vesalius anatomic theatre. The entire area is a wharf. You have no problem going to the railway station. You need to arrive at the Vesalius heritage entrance between 13:45 and 14:00. What is the most convenient way for you to find information on the buses from the station to the anatomic theatre?

Discussion: where exactly is that anatomic theatre? Normally, the Open Monument Day event organiser suggests routes on their website.

Solution: the city of Leuven should have a good overview of all events + how to get there.

2. There is a fancy new online ticketing system that no longer gives you a paper ticket. How can you trust that your ticket is OK (paid for correctly)?

The existing online 10 ride ticket with activation of 1 ticket is clear. All online and sms ticket systems should provide the possibility to save the ticket as pdf so it can be printed or shown on the screen.

3. There are construction works on the road. You are on the bus, but it takes a different route, through a part of town that you don’t know. You are not sure where to get off. What information do you need in order to know how to best reach your destination?

Discussion: Put a paper at the front of the bus so people can see it when they get on the bus? Or the driver can announce it. But that is problematic when the bus is full. What about temporary stops?

Solution: in buses with a screen: indicate the detour on the screen, if no screen, display it on paper.

4. You took [a very vulnerable person] to town for shopping. He/she is used to taking the bus, but cannot normally take the bus alone. You twisted your ankle and need medical help. Someone can pick up the very vulnerable person at the bus stop near his/her home.

Discussion: The driver could help, and normally will, but does he always have the time to do it?

Foresee a special seat next to the driver with priority for people requiring some assistance? Have guidelines and a call centre for the drivers to call for assistance for a passenger?

Solution: It is possible to identify stops in advance where such situations are more likely to occur, e.g. near the ER entrance of hospitals. Use scripts for these special situations on the lines stopping there.

5. Oh no! You forgot your backpack in the shuttle! What should the bus service provide to solve this issue?

Discussion: lost and found at the bus depot.

Solution: a Facebook reporting page, so other passengers and the driver may notice it. Work with pictures, like the police!

6. You are on the bus to the city centre. Again deviations due to an event! Where do I have to get off the bus? What is the most convenient way for you to get information on changes in the bus service (while in the bus)?

Discussion: What is the difference with construction works? The main street (Bondgenotenlaan) is very frequently closed for buses due to events. Maybe an alternative shuttle should be used to bring people as close as possible to the centre? Or make an alternative 'event' route?

Solution: Have event routes, stops or shuttles, … as a standard, known variant to the 'normal' route.

7. Reorganization of the service, the bus-numbers have changed! What is the most convenient way for you to get information on changes in the bus service (before getting on)?

Discussion: Let people know in time when changes are planned, it is hard to find what changes when, where. At least one month in advance, make it clear on-site, with flyers in buses and signboards

Solution: have a transition period, with mentioning new number and previous old number.

8. Problem! There is a mechanical issue and the bus stops. What should the bus service provide to remedy this inconvenience?

Discussion: Send another bus asap.

Solution: The driver should also give information asap about the expected delay.

9. You want to get off the vehicle, but the doors do not open! What should the bus service provide to solve this issue?

Discussion: It happens a lot. It is a problem when travelling with a pram.

Solution: Shout at the driver. Usually the door can be opened.

10. You want to buy a ticket via the app on your phone. But right now, your phone drops dead! What should the bus service provide so you can ride without being a free-rider?

Discussion: And you can't even check a pdf on your phone, because your battery is empty?! It should still be possible to pay cash on the bus. In some buses (and in MIVB buses in Brussels), it is possible to pay by swiping a payment card. The problem is, how do you know the payment was OK? How does the ticket inspector know it? Sometimes you swipe several times and end up paying twice for the trip.

Solution: there should be a way to see that the payment is OK.

11. It rains/snows/freezes and you are afraid of slippery pavement. What should the city provide you as information to help you choose your walking route to the bus stop?

Discussion: Known places in Leuven where the pavements get very slippery, e.g. when going down the tunnel at the station on the Kessel Lo side, everywhere with cobblestones, …

Solution: Create some sort of hotline, this could also be shared through Facebook, e.g. Facebook of the City of Leuven, so when someone sees it, they can share it with others.

12. You want use the bus service to travel to a PT stop but the service is disrupted by a bus drivers' strike. What should the bus service provide to facilitate your transport?

Discussion: experienced the situation that on a bus strike day the information board mentioned there would be a bus in 30 min. After 30 min. the sign disappeared, then reappeared, with the next bus in 1 h. We ended up waiting almost 2 hours not daring to leave the bus stop, and not knowing how long it would take.

Solution: The information provided on the signboards, website, PT app, … should be reliable at all times, even when there is a strike.

Session 2

Date and Location: 31/8/2023, Stadskantoor Leuven

Number of participants: 4

Target groups represented:

- man, blind,
- man, visually impaired (can't travel alone),
- woman, wheelchair user with autism and language barrier
- woman, wheelchair user and limited use of hands

Challenges discussed:

1. Oh no! You forgot your backpack in the shuttle! What should the bus service provide to solve this issue?

Discussion: Driver takes it to terminus and it gets collected there (but does the drives notice, does he have the time?)

Solution: Have a way to text a message to operator to warn driver (+ feedback)

2. You want to get off the vehicle, but the doors do not open! What should the bus service provide to solve this issue?

Discussion: Large bell to stop/emergency button – but do drivers notice and are the buttons accessible?

Difference between button for regular stops and emergency stops is not very clear. Notification system for the driver, based on GPS perhaps? Better vision for drivers with camera's. Smart camera's detect situation.

3. You are on the bus to the city centre. Again deviations due to an event! Where do I have to get off the bus? What is the most convenient way for you to get information on changes in the bus service (while in the bus)?

Discussion: App should warn and give information. Ask driver about route and alternative stops. Better/more accurate/ timely information on different channels (app/screens/announcer)

Solution: Avoid this as much as possible. Days with alternative routes decided on and communicated asap so people relying on an app (such as visually impaired) know what is happening.

4. There is a fancy new online ticketing system that no longer gives you a paper ticket. How can you trust that your ticket is OK (paid for correctly)?

Discussion: Check banking app, confirmation email. Somebody to call for help? Driver/onboard personnel

Solution: All external applications (like MaaS) should be thoroughly checked for accessibility

5. You want to buy a ticket via the app on your phone. But right now, your phone drops dead! What should the bus service provide so you can ride without being a free-rider?

Solution: Contactless payment with clear visual and sound message that payment is OK.

Cash is in most cases less convenient/accessible

6. It rains/snows/freezes and you are afraid of slippery pavement. What should the city provide you as information to help you choose your walking route to the bus stop?

Discussion: Clearly indicate where sidewalks are slippery or where roads are salted. Clear rules about snow clearing with attention for accessibility

7. Reorganization of the service, the bus-numbers have changed! What is the most convenient way for you to get information on changes in the bus service (before getting on)?

Discussion: Automatic notification in app for often used routes. Information online is available, but not always accessible enough

Solution: Give users option to receive text messages for matters that fit their profile, “tell me”…

8. You are on the bus to the city centre. Again deviations due to an event! Where do I have to get off the bus? What is the most convenient way for you to get information on changes in the bus service (while in the bus)?

Discussion: App should notify. Clear and easily accessible information on accessible bus stops. Dedicated assistant that you can call for help. Somebody (volunteers?) from the city who can do this (not only for busses). Chat bot for first line

‘Joker’ challenge:

Very busy/larger/longer buses are really difficult to navigate, especially because of shared platforms for different lines at the same time

Clearer rules or information where which bus will stop where, when, so there is no uncertainty

Clues on the platform about where to stand for a specific bus approaching, similar to train stations announcing which train is entering the station at which platform.

A.2 Versailles Grand Parc

Measure: This experience serves different measures of the Ile de France UPPER project:

IDF_01: Participative governance framework for the update of the regional SUMP

Institut Paris Region which is in charge of leading most of studies related to public transport in the Region Ile de France, and which contributed largely to updating the SUMP and will remain a central actor on this matter in the future was on lead to experience the Serious Game. This new method to collect the needs and feedback of users will contribute to their work in order to help the Region (lead transport authority) and local communities of cities (secondary transport authorities) of the region Ile de France to better understand and apprehend needs of users, perception of PT, improvement possibilities.

IDF_08: Improve public perception of PT

Serious Games are a wonderful opportunity to connect people of a territory with the Public Transports network that is available to them. By making them feel listened and more implicated on the making of the offer, we push them to consider commuting by public transports probably more than before they were offered to participate.

Finding participants as not an issue at all, and UPPER partners felt a lot of enthusiasm from users and inhabitants who were willing to participate.

Game Objective: The game had the objective of trying a new and innovative method for collecting the needs and feedback of PT users. Subject selected by the Ile de France partners is: “public transport user information in disrupted situation”

A.2.1 VERSAILLES GRAND PARC GAME SESSIONS

Session 1

Date and Location: 6th of September 2023, premises of Versailles Grand Parc Agglomeration, Versailles (Yvelines, Ile de France)

Number of participants: 4

Target groups represented: inhabitants of Versailles Grand Parc Agglomeration

Challenges discussed: 1. Cf. spreadsheet in section 1.3. All two groups were presented the same challenges

Session 2

Date and Location: 6th of September 2023, premises of Versailles Grand Parc Agglomeration, Versailles (Yvelines, Ile de France)

Number of participants: 3

Target groups represented: inhabitants of Versailles Grand Parc Agglomeration

Challenges discussed: 1. Cf. spreadsheet in section 1.3. All two groups were presented the same challenges

Summary of challenges discussed for both sessions:

Information

- Real time remains the essential level of information. The multiplication of real-time information channels appears essential: screens at stops, operator websites, applications, push systems that send information directly to the smartphone, etc.
- We noted that no participant was aware that QR code system is provided at each stop, providing real-time information today. It would therefore be necessary to work on the promotion of this device.
- Human presence is acclaimed. Participants insisted on the multiple advantages of maintaining a human connection at the station: it provides security, it allows for detailed information, etc.
- However, some participants would like these agents at the station (or on board the trains) to be better trained. They find that their lexical level is sometimes too limited.

- "Classic" traveller information media are deemed essential (maps, timetables, etc.). No desire for "all digital" but rather to maintain complementarity in the information media
- Several participants mentioned the need to centralize information in a single mobile application with, if possible, the integration of all modes of transport. The MAAS is therefore naturally mentioned
- The diversity of mobile applications used is large: SNCF Connect, Google, City Mapper, RATP…. The Ile-de-France Mobilités app is little used by participants
- Announcements on board trains in the event of problems are considered too generic. They should be more detailed and educational.

Security

- Strong level of light remains a good way to secure a bus stop
- The participants expressed the need for a call button system on board to alert the emergency services in the event of an unsafe situation

A.3 Valencia (User Information)

Measure: VAL_07 - To provide the citizens with clear and accessible information before and during the trip.

This measure aims to develop a real-time information service for public transport, providing updates on factors that impact performance and travel time (traffic, road works, events, accidents, etc.). A platform will be created to deliver this information to transport operators, enabling them to manage the service and take corrective actions when necessary (route adjustments, frequency changes, etc.). Additionally, real-time performance information will be provided to public transport users through screens, apps, and other channels to enhance transparency and build trust in the service.

Game Objective: The objective of the session was, through gamification, to obtain quality information from three participants, all of them vulnerable users. The working group was composed of a partially visually impaired elderly person, and two hearing impaired elderly persons. Through the game, we managed to learn the opinion of this group of people in an enjoyable and collaborative way, where each of their opinions was heard and taken into consideration by the rest of the participants, achieving valuable conclusions that formed a cohesive approach for the implementation of this measure.

Challenges: The different challenges were collaboratively designed between ETRA, IBV, and EMT to address the topics that we considered most important for the proper implementation of measure VAL_07, which has a strong human factor as it seeks to provide reliable and real-time information on the bus operation to PT users. The challenges are described and answered with the opinions of the working group in the following section of this document. It's worth noting that, in addition to these pre-established challenges, an extra challenge called "joker" was added, which involved each participant presenting a specific situation based on their experience when using the bus service. This way, we allowed participants the freedom to express their opinions without being constrained by questions or situations imposed by the pre-designed challenges.

A.3.1 VALENCIA (USER INFORMATION) GAME SESSION

Date and Location: 25/09/2023 at the IBV (Instituto de Biomecánica de Valencia)

Number of participants: 3 project members (1 from ETRA, 1 from IBV and 1 from EMT), along with 3 vulnerable users (previously described).

Target groups represented: The working group was composed of a partially visually impaired person (Participant 1), and two hearing impaired elderly persons (Participant 2and Participant 3).

Challenges discussed:

1. Situation: There is an event in the city (Fallas, a race, a demonstration) that forces EMT to make a change in the bus lines. You don't really know if the line and stop you usually take will be running during those days.

Question: What information would you like to receive in these cases? What is the most convenient way to be informed about the planned changes? By what means (at the bus stop, on board, Twitter, APP, SMS)?

Insights: Participant 3 highlights that information about changes in routes and stops during events (Fallas, races, etc.) is often complex. She suggests that information about route or stop changes should be provided at the bus stop itself (for older people who don't use apps), through the website, and via the app. David (EMT) mentions that they have started working with a company to update bus stop paper posters in case of diversions or route changes and to provide alternatives for users (alternative stops, temporary stops, etc.). Participant 2suggests it would be convenient to receive this information on a mobile phone in advance, rather than realizing the change once you're already at the stop (to minimize time losses). A clear example is what happens in the summer when routes are modified to reach the beach area. Such changes are not always indicated at the stops.

2. Situation: You want to catch the bus that passes in front of your house at 17h, but there is an unexpected change in the line due to an accident and collapse on the road. Some of the buses are being rerouted to another stop.

Question: What information would you like to receive in these cases (alerts, alternatives...)? By what means (stop, Twitter, APP, SMS, audio...)?

Insights: Participant 3 suggests that the key is to provide information to the users while they wait at the bus stop. There used to be a button that you could press to get information about when the next bus was coming. However, with the remodelling of the bus stops, it was decided to remove that button. All three users agree that the removal of that button is a step backward. They also agree that providing information through the app is fine, but older people prefer other methods since they are not accustomed to using apps. Participant 2mentions that the bus stop screens usually offer information about the upcoming buses and specific incidents (bus out of service, etc.). However, they don't always work correctly and the information they provide is not always clear (he doesn't understand why it says a bus is out of service when it's actually full).

Participant 1 suggests that in the case of a bus diversion to another stop, she would need directions on how to get to that other stop. She memorizes the route, so she needs audio instructions on how to reach another stop whose location she is not familiar with. She suggests replicating what's available in the metro, which includes an assistance intercom to ask specific questions (requesting directions to another stop could be an example).

3. Situation: You are at a bus stop waiting for your bus. Several lines pass by that stop.

Question: What information would you like to receive regarding upcoming buses (actual arrival time of the next buses, line disruptions, unexpected delays...)? By what means (at the bus stop, on board, Twitter, APP, SMS, audio...)?

Insights: All three users agree that it would be convenient to provide information (through screens at bus stops and also through acoustic announcements) about upcoming buses, indicating the line number and the remaining time until arrival, in order of arrival. The question was raised about whether it would be recommended to provide this information through audio in a loop (every 2 minutes, for example) or if it's better to provide information "on-demand." Participant 2comments that providing audio information every few minutes can be annoying for people living nearby. He suggests that the information be displayed on screens, and that by pressing a button (located at the stop), the information be provided via audio ("on-demand"). Participant 1 adds that in case of an alert or incident, it should be automatically displayed on the screen and announced through audio (as in the metro).

In summary:

- Information about routes (upcoming lines and arrival time): Through screens and also via "on-demand" audio (by pressing a button).
- Information about alerts or incidents: Screens and audio.

It has also been mentioned the uncomfortable situation when you're waiting for a bus, and the estimated arrival time information keeps changing continuously (now 2 minutes, now 8 minutes...). This leads to frustrating situations, so it is necessary to work on the provision of accurate and reliable information.

Finally, it has also be highlighted that the bus only stops if someone (onboard or at the bus stop) requests it. This is particularly challenging for people with visual impairments. Participant 1 suggests that a "stop request mechanism" be included at the bus stop and/or in the app.

4. Situation: The bus you want to catch is approaching the stop where you are. You are uncomfortable getting on a bus and there is no room to sit down, or it is too crowded, for example. You are also afraid of getting on the wrong bus.

Question: What information would you like to receive before the bus arrives (bus destination, occupancy, space availability for VRUs...)? By what means (at the bus stop, on board, Twitter, APP, SMS, audio...)?

Insights: Participant 3 suggests that an "on-demand" information button at bus stops can be used to provide information about bus occupancy or the availability of space for VRUs on board. Participant 1 specifies that there used to be a button in the bus stop that provided information about upcoming lines, although it was often not heard clearly. The button or speaker should be located in a part of the bus stop with better acoustics.

5. Situation: You are on board a bus. You're not too used to taking this line, so you don't know the stops and the exact route.

Question: What information would you like to receive while you are on board (next stop, changes in the line, connection with other means of public transport such as metro, tram, or other bus lines...)? By what means (at the stop, on board, Twitter, APP, SMS, audio...)?

Insights: Participant 2mentions that currently, only visual information about the previous stop, the current stop, and the next stop is provided on the screens. Participant 1 suggests that it would be interesting for them to announce via audio the upcoming stop inside the bus. The information should be provided on board the bus through screens, the app, and also through loudspeakers, ensuring that the audio is clear (as often the audio is very low and barely audible). All three users agree with Amparo's (IBV) proposal to not only announce the name of the upcoming stop but also include references to well-known buildings or landmarks (e.g., approaching La Fe hospital, approaching Torres de Serrano, etc.). David (EMT) mentions that some stops have recently been renamed to reference well-known landmarks or buildings (e.g., “MUVIM” stop, "Beneficiencia" stop). Participant 1 suggests that it's a good initiative and could be expanded. Again, Participant 1 suggests to provide the information about where you are approaching through loudspeakers as well.

6. Situation: The bus you are on is at a standstill (due to a traffic jam, an accident or a technical problem). You don't know how long it will be stopped, so you don't know whether it's better to get off or wait. You have a lot of doubts and uncertainty.

Question: What should the EMT service do to remedy this inconvenience? What information would you like to receive in such a situation (estimated delay time, alternatives of other modes...)? By what means (at the bus stop, on board, Twitter, APP, SMS, audio...)?

Insights: Participant 3 mentions that currently, it's the driver who informs in case of incidents or breakdowns (although not in case of traffic jams). They think it's ok for the driver to provide direct information, but it would be interesting to know both the reason for the stop and the estimated wait time.

7. Situation: You are on the bus, but suddenly the bus takes a different route due to roadworks. The bus takes a detour through an unfamiliar part of the city and you are not sure where to get off.

Question: What should the EMT service offer to make you feel safe? What information do you need to know the best way to get to your destination? What is the most convenient way to get information about changes in the bus service (while on the bus)?

Insights: All three users suggest providing information (via screens and audio) about the stops on the new route, indicating not only the stop's name (since often, the street is unfamiliar) but also well-known elements (buildings, monuments, etc.) that can help the user orient themselves and identify the route.

8. Situation: You're on the metro and you know that, when you get to the Alameda stop, you'll have to get off the metro and take a bus. However, you don't know if you're going to have to wait a long time, if the bus is late, if it's very full... In short, you don't know if the bus is the best option or if it's better to look for an alternative.

Question: What information would it be useful for you to receive before going to the bus stop in order to solve your doubts? By what means (at the bus stop, on board, Twitter, APP, SMS)?

Insights: Participant 2mentions that in such cases, he usually uses Google Maps. However, he notes that Google Maps is often unreliable because it lacks real-time information about bus locations and traffic conditions. Google Maps sometimes suggests the quickest route involving changing from the metro to a specific bus but doesn't account for more efficient options. Amparo (IBV) agrees and says that Google Maps information isn't always reliable. Participant 2suggests that metro stations should provide information about nearby bus stops and that transport operators should collaborate more with each other. David (EMT) mentions that the EMT app is like a mini Google Maps that provides information about bus connections, although it lacks information about other modes of transport (metro, tram, etc.). Participant 1 suggests that information about connections should also be provided in audio format. In the case of the app, she suggests providing information in text format (since there are automatic text readers), not just through images (as these apps cannot convert images to audio).

9. Situation: EMT reorganises its service - the bus numbers have changed!

Question: What (how and when) is the most convenient way to be informed about changes in the bus service (before boarding)? By what means (at the bus stop, on board, Twitter, APP, SMS)?

Insights: All users agree that the key in these cases is anticipation. Line changes don't happen overnight, so Participant 2suggests that information about the change and the effective date should be provided on each bus unit of the affected line, as well as at the stops served by the line. Participant 3 suggests that the information should be provided for a considerable time so that users can become familiar with it before the change. Participant 1 once again suggests that the information should be provided not only on bus and stop screens but also through loudspeakers. David (EMT) agrees that information should be provided in advance (with sufficient time), although unfortunately this is not always the case.

10. Situation: You want to use the bus service to go to a bus stop, but the service is disrupted by a bus drivers' strike.

Question: What should the EMT service do to make transport easier for you? What information should it provide you with? By what means (at the bus stop, on board, Twitter, APP, SMS, audio...)?

Insights: David mentions that in the event of a strike, there are minimum services (by law). Participant 2suggests that information about the minimum services offered should be provided (at least at the bus stop itself), not only through the EMT app or social media, as not everyone has access to them.

A.4 Oslo

Measure: OSL05 Demand Responsive Transport Solutions

Game Objective: The target group tends to struggle with the digital interface when booking our DRT-service. How can we simplify and increase the share of app bookings?

A.4.1 OSLO GAME SESSIONS

Session 1

Date and Location: August 23rd, 2023

Number of participants: 4

Target groups represented: 67+ years old (users of age friendly transportation)

Session 2

Date and Location: September 22nd, 2023

Number of participants: 4 (+ senior centre supervisor)

Target groups represented: 67+ years old (users of age friendly transportation)

Summary of discussion: Overall, the participants had varying levels of familiarity with using smartphones, apps in general and RuterBestilling specifically. Some were comfortable using the app independently, while others preferred assistance.

The first group we encountered was accustomed to using RuterBooking to book trips with age-friendly transportation and generally found it to work well. Those who hadn't downloaded the app on their own had relied on "digital grandmothers," guidance at the senior centre, or close family to make it happen. They had a relatively low threshold for asking for help and believed that human guidance was far better than brochures and other printed materials. "Most people who aren't computer-savvy need someone to show them. Some are afraid to experiment within the app, fearing they might mess something up."

There was a consensus that the app itself worked well. It's used on smartphones, not tablets. Bookings, changes, and confirmations seem easy to locate and modify in the user interface. Some mentioned that it could be pleasant to talk to someone at the customer service centre to book trips, but the majority found it easier to do so through the app. Information shared via SMS (about delays, arrival times, etc.) received positive feedback from all. Most were accustomed to navigating TaxiFix's map feature and found it to work excellently. "Getting a call from a customer service representative/driver is just bothersome."

Participants suspect that those who don't use the app may have a general skepticism or lack of competence with all apps—not necessarily just RuterBooking.

The second group we encountered was far less digitally inclined and hadn't tried booking trips through the app. All of them had smartphones (in addition to Doro phones), but they were primarily used for making calls or sending texts. App usage, in general, was low. "I'm not very fond of smartphones and don't know anything about apps." Users preferred leaving their smartphones at home and instead used the Doro phone when running errands.

For these participants, the design of the app wasn't the issue. They simply lacked the motivation to use it because phone bookings worked so well for them. They were prepared for waiting times and knew how far in advance they needed to book a trip to secure a spot.

The leader at the health centre emphasized the importance of recognizing the diversity within the 67+ age group, where some are highly skilled in digital technology while others may never own a smartphone or know how to use one. By limiting bookings to phone calls, we risk excluding a relatively large group of users from the service. Her suggestion to increase the percentage of app-based bookings revolved around involving centres, institutions, networks, and official channels, such as doctor's offices, physical therapy centres, and city districts.

A.5 Thessaloniki

Measure: TES_07 “Increase the accessibility to PT in low demanded areas of the city” This measure aims to increase the accessibility to PT in Panorama, a sub-urban area of Thessaloniki, with the introduction of a new DRT service that will be developed in order to serve this area. More specifically, the DRT service will connect the “Nomos” area, which is a part of Panorama, to various points of interest, such as the Panorama Athletics Center, and to the new terminal metro station Nea Elvetia of Thessaloniki’s Metro line which will commence operation in 2024. The service will be deployed through co-operation with the largest taxi company of Thessaloniki, i.e. Taxiway. The currently available PT services for the selected area are considered insufficient.

Data from similar pilot services that have run successfully in other low demand areas of Thessaloniki within the framework of European projects, will be extracted and used as historic data. Additionally, an updated survey in the areas of interest will explore travel characteristics to optimally design the proposed measure. The DRT service will be developed as a physical service and travellers will be able to book their trips in advance and pay via a dedicated platform/application.

Game Objective: The objective of the sessions was to use gamification in order to obtain quality information from twelve (12) participants (six in each game session), representing various population groups. More specifically, the two working groups were composed of an elderly person with reduced mobility, three mothers with young children under their care, two fathers with young children under their care, two young boys aged under 18, three ladies and a young man. During the game, we managed to acquire the thoughts of participants in an enjoyable and collaborative way through fruitful discussions, achieving valuable conclusions that formed a cohesive approach for the implementation of this measure.

Challenges: The different challenges were collaboratively designed between HIT/CERTH and THETA, with the valuable contribution of KU LEUVEN to address the issues that were considered most important for the appropriate implementation of measure TES_07, which has a strong human factor as it seeks increased accessibility to PT in a low demand area of Thessaloniki. The challenges are described and answered with the opinions of the working groups in the following section of this document. It's worth noting that, in addition to these pre-established challenges, an extra challenge called "joker" was added, allowing participants to present a specific challenge they experienced using PT. This way, participants were offered the opportunity to express their opinions without being constrained by questions or situations imposed by the pre-designed challenges. The individual challenges are listed below.

A.5.1 THESSALONIKI GAME SESSIONS

Session 1

Date and Location: 01/09/2023 at HIT/CERTH (Hellenic Institute of Transport)

Number of participants: 3 project members (2 from HIT and 1 from TheTA), along with 6 participants representing various population groups.

Target groups represented: The working group was composed of one (1) mother with young children under her care (Participant 1), two (2) fathers with young children under their care (Participant 2 and 3), one (1) lady (Participant 4) and two (2) young boys aged under 18 (Participant 5 and 6).

Challenges discussed:

1. There are construction works on the road. The vehicle takes a different route, one that you do not know. You start to panic! What should the DRT service provide to make you feel safe?

Insights: The main suggestion was to inform passengers about the different route that the vehicle will take in order to know the exact deviation and do not feel uncomfortable. Moreover, it was highlighted that information about the new arrival time is crucial so that users can reorganize their trip if necessary. It was also suggested that except from the arrival time, information about timetables of other public transport services is very important in order for users to be able to reorganize their trip in case the new arrival time differs from the initially expected.

Finally, it was highlighted that the bus/taxi driver should be informed about construction works on the road and should inform passengers about the different route upon boarding.

2. It is a long walk to the fixed DRT stop and the road feels unsafe because of many cars. What should the DRT service provide to make you feel safe?

Insights: The discussion focused on the application that will be developed for the service. All participants agreed that if the application had the capability to depict a safe pedestrian route from/to origin/destination to the DRT stop it would be more convenient and safer for users to reach the DRT stop.

Additionally, it was indicated that the area around a stop should be appropriately designed. It was proposed that it should have safe crosswalks, sufficient lighting, traffic lights for speed reduction etc. It was mentioned that it is preferable to install the DRT stops on light traffic roads.

3. It is a long walk to the fixed DRT stop and it is a very hot day. What should the DRT service provide to make you feel more comfortable?

Insights: The main suggestions regarded the application of the service. Participants agreed that the application should inform users about the temperature when they book the service (for example, “Caution: high temperature!”).

One (1) mother (Participant 1) and one (1) lady (Participant 4) also noted that the application could provide advice according to the age of users. For example, “It is not recommended for vulnerable users or elderly people to book the service today because of high temperature!”.

Finally, it was discussed that the installation of shelters and trees at the DRT stops would make it less inconvenient to wait for the DRT service under difficult weather conditions, offering users a place where they can rest after a long walk in a very hot day.

4. DRT stops can be flexible and, due to many requests, a longer detour and travel time is expected. What should the DRT service provide you for mitigating the negative implications of the increased travel time?

Insights: Some of the participants suggested that the DRT service provider could offer a bonus to users due to the delay in the form of either a fare discount or a “small gift” such as coffee, water, or free Wi-Fi access to mitigate the negative implications of the increased travel time.

Other participants proposed that the cost of the service could be dynamic according to the number of passengers in the vehicle (more passengers in a vehicle – bigger route time – lower fare).

Finally, the young boys mentioned that they might consider cancelling their booking of the service if the increased travel time would result to them being late for their after-school activities.

5. You need help to get into or out of the vehicle. What should the DRT service provide to assist you boarding?

Insights: All participants agreed that the driver should be able to help users if they need help.

Additionally, they mentioned that vehicles should be appropriate for all users and especially vulnerable ones. Users should be ensured that the vehicle they will use is appropriate for them and be informed about it via the app.

Finally, they indicated that if there were various vehicle types available for the service, there should be an option for users to select the most appropriate vehicle for their journey when they book the service via the app.

6. You are travelling with a toddler in a stroller, with a lot of bags. What should the DRT service provide to make you feel safe and comfortable?

Insights: It was suggested that sufficient space for luggage and strollers is essential in every vehicle. Moreover, participants indicated that help from driver or staff is crucial for the convenience of users travelling with a toddler and that a car seat appropriate for toddlers should be available upon request when booking.

7. You are traveling with an infant/toddler and there is traffic on the road. Your infant/toddler gets upset. What should the DRT service provide to help the infant/toddler relax?

Insights: Two mothers mentioned that there could be flexibility to make short stops in order to help the infant/ toddler relax. Also, relaxing music/lullabies could help the situation.

Moreover, it was proposed by all participants that a cooler with water should always be available. Finally, tablets or screens and small toys could help distract the infant / toddler and could ease the situation.

8. You want to use DRT service to travel to a PT stop to travel to the city centre but the bus drivers are on strike. What should the DRT service provide to facilitate your transport?

Insights: Participants agreed that the application should provide information regarding active strikes to help avoid unnecessary transfers. Also, some participants suggested that information about alternative means of transports besides the PT and the DRT service (e.g., taxis) could help complete the journey.

9. Oh no! You forgot your backpack in the vehicle! What should the DRT service provide to solve this issue?

Insights: Most of the participants suggested that a direct communication with the driver through the app could resolve the issue. In addition to this, a direct notification to the user through the app would also be very helpful.

10. You booked your ticket via the app on your phone earlier, but by the time you want to use it, your phone drops dead. What should the DRT service provide so you can ride without being a free rider?

Insights: It was suggested that there should be other types of identification available that the DRT driver could use, e.g., the user's email showing the user's past and current bookings.

Moreover, some participants indicated that a physical card for frequent users displaying a unique user code could prove useful in these sorts of situations.

11. You want to get off the vehicle, but the doors do not open. What should the DRT service provide to solve this issue?

Insights: All participants agreed that a panic button should be available in the vehicle providing direct communication with the call centre of the DRT. Also, a small hammer could be available in the vehicle in order to break the glass, in extreme situations, if needed.

12. You sent your trip request 10 minutes ago but the service provider assigns you to a route that is going to start 1 hour later than what you wanted. What should the DRT service provide you for mitigating the negative implications of the increased waiting time?

Insights: It was suggested that if different types of vehicles are available, in terms of number of passenger seats, the larger ones should be selected in order to serve more passengers. Also, all participants mentioned that an increase in the number of available vehicles would result in decreasing delays. In addition to this the app could provide information for alternative means of transport.

13. Problem! There is a mechanical issue and the vehicle stops. What should the DRT service provide to remedy this inconvenience?

Insights: Participants suggested that a backup vehicle should be always available in order to resolve this type of inconveniences. Moreover, they indicated that a link to the timetables of the available PT services in the area could be available in the app of the DRT service in order for the user to decide if they will use another PT service or wait for the backup vehicle to arrive at the incident.

14. When you get inside, the vehicle departs immediately and very abruptly. You may fall and you break your hip! What should the DRT service provide to alleviate/avoid this issue?

Insights: All participants agreed that the drivers of the DRT service should be properly trained. Also, a notification, either visual or sound, that the vehicle is starting the route could help avoid this type of accidents.

15. The sun is shining; you are in the vehicle which heats up very quickly. You get too hot. What should the DRT service provide to make you feel comfortable?

Insights: It was indicated that vehicles should be air-conditioned. In addition to this, tinted windows could assist keeping the temperature lower inside the vehicle.

16. I would like to know if by choosing a DRT ride, my travel becomes eco-friendlier. What should the DRT service provide you to assess your footprint?

Insights: It was suggested that information through the app about the CO_2 foot print of the route and how much the user is saving (e.g. compared to using their car) would be very useful.

17. You want to book a ride with the DRT service but can't read the text on your cell phone screen. What should the DRT service provide to facilitate your booking?

Insights: Participants agreed that there should be an option within the app to increase font size as well as an option to convert text-to-speech.

18. To guarantee the right time slot, you must book the DRT at least 12 hours before the trip; however, you are not yet totally sure about the time that you would like to start your trip. What should the DRT service provide to assist you organize your trip properly?

Insights: All participants agreed that booking a trip 12 hours earlier is quite binding. There should be flexibility and when the time is getting closer to their booking (e.g., 4 hours earlier), users should be able to select a more specific time slot for their trip.

Joker Challenge

Insights: Some of the participants described that the existing telematics services at bus stops do not show the correct arrival time of bus lines, resulting to users' confusion and inconvenience as they arrive with significant delays to their destination.

Moreover, it was highlighted that some of the buses do not have air-condition or accessibility ramps.

Session 2

Date and Location: 01/09/2023 at the HIT/CERTH (Hellenic Institute of Transport)

Number of participants: 3 project members (1 from HIT and 2 from TheTA), along with 6 participants representing various population groups.

Target groups represented: The working group was composed of two (2) mothers with young children under their care (Participant 1 and Participant 2), an elderly person with reduced mobility (Participant 3), two ladies (Participant 4 and Participant 5) and a young man (Participant 6)

Challenges discussed:

1. You want to book a ride with the DRT service but can't read the text on your cell phone screen. What should the DRT service provide to facilitate your booking?

Insights: Participant 4 suggested an option to convert text-to-speech would be useful. Participants also pointed out that there should be an option to increase the font size.

2. I would like to know if by choosing a DRT ride, my travel becomes eco-friendlier. What should the DRT service provide you to assess your footprint?

Insights: Anna indicated that information through the app about the CO_2 foot print of the route and how much the user is saving (e.g., compared to using their car) would be very useful. In addition, an opportunity to select an electric or

a CNG vehicle (if available), maybe even at a different cost, showing also the comparison between the CO_2 foot prints of different types of vehicles could assist the users to consider and assess their CO_2 footprint.

3. The sun is shining; you are in the vehicle which heats up very quickly. You get too hot. What should the DRT service provide to make you feel comfortable?

Insights: Participant 3 indicated that the vehicles should be air-conditioned. Other participants added that vehicles should have ventilation as well as sunshades.

4. When you get inside, the vehicle departs immediately and very abruptly. You may fall and you break your hip! What should the DRT service provide to alleviate/avoid this issue?

Insights: Participant 6 suggested that there should be a driver performance control system in each vehicle and that all drivers of the DRT service should be properly trained. Moreover, it was discussed that users should be able to evaluate the service and the driver after their journey in order for the service provider to assess whether all drivers of the service comply to the rules and drive safely and appropriately.

5. Problem! There is a mechanical issue and the vehicle stops. What should the DRT service provide to remedy this inconvenience?

Insights: Participant 2 said that it is essential that a backup vehicle be available at all times in order to pick up the passengers and continue the journey, offering the minimum possible disruption.

6. You sent your trip request 10 minutes ago but the service provider assigns you to a route that is going to start 1 hour later than what you wanted. What should the DRT service provide you for mitigating the negative implications of the increased waiting time?

Insights: Participant 1 suggested that a small fare discount (e.g., 10-20%), could be an incentive to the users and lead them to use the service albeit the overall delay.

7. You want to get off the vehicle, but the doors do not open. What should the DRT service provide to solve this issue?

Insights: Participant 4 indicated that the driver of the vehicle should have the necessary technical knowledge in order to ensure that all passenger will get off the vehicle safely using available equipment (e.g., hammer or other tool) on board.

8. To guarantee the right time slot, you must book the DRT at least 12 hours before the trip; however, you are not yet totally sure about the time that you would like to start your trip. What should the DRT service provide to assist you organize your trip properly?

Insights: Anna suggested that the service app should provide a more flexible booking option. For example, there could be a list of 3-hour timeslots allowing the user to pre-book a specific timeslot 12 hours before their journey and asking them to make a more specific time selection up to 3 hours before their journey.

Joker Challenge

Insights: Participant 3 referred to the obstruction of the PT bus services which is very common in Thessaloniki due to unannounced road blocks and illegal parking on narrow streets as one of the most common challenges a user may experience. Participants agreed that road blocks should always be pre-announced and they discussed that the traffic police should enforce / remove illegally parked vehicles and that the bus operators should use smaller and more flexible vehicles for specific bus lines crossing narrow street areas.

10. You booked your ticket via the app on your phone earlier, but by the time you want to use it, your phone drops dead. What should the DRT service provide so you can ride without being a free rider?

Insights: Participant 6 suggested that there should be other options of identification available. For example, the user could show the driver their personal ID which can be matched to the name under which the booking was made or

even their email address that should be available to the driver via the app. It was also discussed that the users should be able to charge their phones enroute.

11. DRT stops can be flexible and, due to many requests, a longer detour and travel time is expected. What should the DRT service provide you for mitigating the negative implications of the increased travel time?

Insights: Participant 2 indicated that the DRT service provider should recalculate the estimated travel time and notify the user, preferably in advance. The service provider could offer some kind of compensation (e.g., a fare discount or an extra free journey) to the affected users. Also, free Wi-Fi access may mitigate the negative implications of the increased travel time.

Regarding the possible fare discount, it was extensively discussed that since the value of time of each traveler differs and is usually strongly related to the travel purpose, it should be considered that longer travel times may be significantly disruptive for certain types of users thereby discouraging them from using the service.

All participants agreed that, if possible, the service route should be designed taking into account the priority when booking.

Finally, a participant mentioned that users could be informed about the increased travel time (at least 1h before their journey) so that they can decide if they will use the service or not.

12. You need help to get into or out of the vehicle. What should the DRT service provide to assist you boarding?

Insights: Participant 1 suggested that it is crucial that the driver has the appropriate training in helping users when they need assistance. Moreover, it was indicated that users could inform the operator via the app about their special needs and requirements and a suitable vehicle would be routed if possible. In any case, participants agreed that the user should be able to inform the service regarding their need of assistance when booking so that the service provider can facilitate their needs.

13. It is a long walk to the fixed DRT stop and it is a very hot day. What should the DRT service provide to make you feel more comfortable?

Insights: Participant 4 suggested that in very hot days the DRT service could offer bottles of cold water free of charge for the users.

14. It is a long walk to the fixed DRT stop and the road feels unsafe because of many cars. What should the DRT service provide to make you feel safe?

Insights: Participant 5's suggestion was that maybe it would be better to consider designing a door-to-door DRT service than a DRT service with fixed stops. Participant 3 added that if the stops were to be fixed, the application of the service should provide a safe walking route connecting the user's start point to the selected DRT stop.

15. Oh no! You forgot your backpack in the vehicle! What should the DRT service provide to solve this issue?

Insights: Participant 3 suggested that there should be a "lost and found" service that passengers can contact to look for their forgotten items. Other participants added that there should be a notification to the users via their mobile phone or the app regarding this issue.

16. You are traveling with an infant/toddler and there is traffic on the road. Your infant/toddler gets upset. What should the DRT service provide to help the infant/toddler relax?

Insights: Participant 6 indicated that tablets or screens and small toys could help distract the infant / toddler and could ease the situation.

17. There are construction works on the road. The vehicle takes a different route, one that you do not know. You start to panic! What should the DRT service provide to make you feel safe?

Insights: Participant 2 suggested that the vehicle could be equipped with a screen on which users could see the different route that will be followed in order to know the exact location and not feel uncomfortable. This could be

accompanied with a notification message (on screen and / or audio) such as: “Your journey is rerouted via XXX street due to construction works”.

Additionally, all participants agreed that the new expected arrival time could also be shown on the screen. If the rerouting is known prior to the journey, this information could also be available on the application to notify users in advance and make them feel safe.

18. You are travelling with a toddler in a stroller, with a lot of bags. What should the DRT service provide to make you feel safe and comfortable?

Insights: Participant 1 suggested that adequate space for luggage and strollers is essential in every vehicle. Moreover, participants proposed that the application could give users the opportunity to indicate that they are travelling with a toddler when booking the service in order for the operator to assign the most appropriate vehicle for their journey.

19. You want use DRT service to travel to a PT stop to travel to the city centre but the bus drivers are on strike. What should the DRT service provide to facilitate your transport?

Insights: Participant 4 suggested that it is crucial to provide information regarding strikes through the application during booking in order to help users organize their trip more efficiently using alternative transport options.

A.6 Valencia (PT stop)

Measure: VAL_08 - To design and develop an innovative, inclusive and convenient stop for buses.

This measure aims to develop, prototype, and test an innovative, smart, and inclusive bus stop that enhances user satisfaction and improves the public perception with respect to the PT. The design of the PT stop will go through a cocreation process to ensure that it fits the citizens’ needs (in terms of accessibility, attractiveness, safety and inclusiveness). The new bus stop will incorporate a set of services and features to guarantee accessibility, both physical and cognitive, for all users, including those with disabilities or special needs. Furthermore, the possibility of incorporating cameras with AI capabilities to recognize vulnerable users or detect large crowds will be assessed, allowing bus drivers to take corrective measures in advance. Additionally, energy-efficiency criteria will be considered for the design of the stop.

Game Objective: The objective of the session was, through gamification, to obtain quality information from three participants, all of them vulnerable users. The working group was composed of an elderly person with reduced mobility, a mother with young children under her care, and a person with cerebral palsy who uses a wheelchair. Through the game, we managed to learn the opinion of this group of people in an enjoyable and collaborative way, where each of their opinions was heard and taken into consideration by the rest of the participants, achieving valuable conclusions that formed a cohesive approach for the implementation of this measure.

Challenges: The different challenges were collaboratively designed between ETRA, IBV, and EMT to address the topics that we considered most important for the proper implementation of measure VAL_08, which has a strong human factor as it seeks inclusion and innovation applied to bus stops. The challenges are described and answered with the opinions of the working group in the following section of this document. It's worth noting that, in addition to these pre-established challenges, an extra challenge called "joker" was added, which involved each participant presenting a specific situation based on their experience at bus stops. This way, we allowed participants the freedom to express their opinions without being constrained by questions or situations imposed by the pre-designed challenges.

A.6.1 VALENCIA (PT STOP) GAME SESSION

Date and Location: 14/07/2023 at the IBV (Instituto de Biomecánica de Valencia)

Number of participants: 7 project members (1 from KUL, 2 from ETRA, 2 from IBV and 2 from EMT), along with 3 vulnerable users (previously described) and a personal assistant for one of the vulnerable users who also added his insights and opinions.

Target groups represented: The working group was composed of an elderly person with reduced mobility (Participant 1), a mother with young children under her care (Participant 2) and a person with cerebral palsy who uses a wheelchair (Participant 3).

Challenges discussed:

1. You find yourself waiting for the bus at the stop. It is summer and the temperatures are very high. Not only that, but the sun is also shining intensely, which can lead to heat strokes. What adaptations or functionalities should the bus stop have to ensure the comfort of the user?

Insights: The main proposal was to increase the shaded area around and within the bus stop, especially during peak hours. It is also proposed to dimension the stop according to the usual volume of passengers at that specific stop. Another option that was considered was the installation of water misters for situations of extreme heat.

Moreover, it is highlighted that the bus stops are usually located in a fixed place (historical location), without evaluating whether that is really the most suitable location. However, it may happen that by moving the stop a few meters, the shade provided by a building can be used in favor of PT users waiting at the stop. Thus, it is proposed to reassess the current location of the stops.

2. You arrive at the bus stop, but all the pre-trip information such as the estimated time until the next bus, line stops, etc. is visually provided. Through what means and how would you like this information to be provided at the stops?

Insights: On the one hand, it has been suggested that the information, in addition to being displayed visually, should also be presented audibly. This is not only for the benefit of people with visual impairments, but it was also emphasized that it is something that non-disabled users would appreciate.

Additionally, it was indicated that the current screens should be improved (by increasing their size or brightness) since there are times when the sunlight affects the screen, and the displayed information cannot be properly appreciated.

Another proposal is that there should be a quick information button either on the buses themselves or at the bus stops, or acoustic announcements (like in the metro) about incidents, delays, route changes... There should be both visual and acoustic alerts for such incidents, both on-board and before the journey.

3. There is a new ticketing system for the BRT which requires paying at the bus stop, and not onboard the bus. Which aspects should be considered for this new ticketing system (location, instructions, use, etc.)? How can you trust that your ticket is OK (paid for correctly)?

Insights: Participant 3 mentioned that an important aspect for him would be to have the ticketing done outside the BRT, specifically at the bus stop (a system used by trams in Valencia). This way, he could do it independently, as otherwise the ticket would need to be validated by the bus driver (not allowing him to do it autonomously).

Participant 2 also advocates for the installation of ticketing machines at the stops (like in the tram), stating that it would, from her perspective, facilitate boarding speed. With respect to the ticketing system, different payment methods should be allowed (card, mobile, cash, etc.). With respect to the design of the ticketing machine, it should be accessible for people with reduced mobility.

Finally, Participant 1 indicated that, in addition to this new payment system, he would also like to preserve the option of paying in cash to a person (either at the stop or inside the bus).

4. The bus service has been expanded (new lines and stops have been added). How would you prefer to receive this new information, both inside the bus and before boarding?

Insights: The general proposals were for this information to be displayed through the EMT (PTO) website/app, and additionally, to be shown through the channels (mainly screens and signs) available inside buses and bus stops.

5. You're waiting for the bus at the stop, and you see it approaching (especially critical in a BRT). The bus stops, but you encounter difficulties accessing the interior. How would you modify the bus stop to facilitate boarding? And in the case of a BRT, how would you modify the stop to guarantee quick access? (E.g., installing platforms that elevate the stop, define the area for VRUs to access the BRT, etc.).

Insights: On one hand, Participant 2 mentioned that it becomes difficult for her to access the bus, especially when she is carrying a stroller with her baby. It becomes even more challenging when there are many people, and the boarding time is limited. She would like the drivers to be more empathetic and allow her a bit more time at the stops to board.

Additionally, Participant 2 proposed to distribute the different type of users along the different bus doors (one door – with ramp- for people with reduced mobility; one door for people with trolleys and baggage, one door for people with no difficulties for the access, etc.) and indicate that “priority use” in the floor at the bus stop, so that people can wait for the bus in that specific area (depending on their particular needs) and access in a quicker way through a dedicated and prepared door.

Participant 1 advocates for the possibility of accessing the bus through any door (currently, only the one next to the driver is accessible) and to be able to validate the ticket at any door as well.

Finally, Participant 3 finds it difficult to raise his hand to signal the bus to stop. That's why he would like the drivers to default stopping at the bus stop when there are VRUs present (this issue is resolved by the BRT, as it stops at all stops). He also suggested extending the available time for boarding the bus (for VRUs).

6. You're waiting for the bus, it's nighttime or you are in an isolated area, and there's no one else with you at the stop. What safety measures would you like the bus stop to include to ensure you are safe or you feel safe?

Insights: Participant 2 suggests installing an emergency button at bus stops, particularly in certain neighborhoods. This button would silently trigger a surveillance camera, enabling security personnel to monitor any issues and call the police if needed. The presence of a surveillance camera alone could act as a deterrent.

Participant 1 supports this idea, advocating for a camera-activated button that can also alert the police, serving as an additional deterrent.

Participant 3also agrees with the proposal and emphasizes the importance of having a camera and a tele-assistance button for individuals to contact in case of feeling unsafe or endangered.

7. You're waiting for the bus, and there's no one else with you at the stop and you are facing some difficulties or problems (with the ticketing, the access, the information available at the stop, etc.). Would you like the bus stop to include a communication system that allows you to contact an emergency assistance service (police, technical support, etc.)?

Insights: Participant 1 suggests the implementation of a teleassistance button at bus stops, enabling individuals to easily contact the EMT control system for various non-emergency purposes. This dedicated button would provide assistance with ticketing, bus route inquiries, and other non-urgent matters, distinct from the emergency button meant for dangerous situations.

On the other hand, Participant 3's idea focuses on streamlining communication and coordination at bus stops. He suggests the installation of an assistance button at all stops, enabling users of on-demand service to contact the on-demand bus drivers and inform them of their presence at the stop. This feature would facilitate efficient pickups and smoother service delivery.

8. It is raining. The platform is slippery. You are afraid that you will fall when you get out of the bus. What should the shuttle service provide to avoid this issue?

Insights: Participant 3 focuses on the issue of wheelchair wheels getting wet and slipping on the ramp, even when there's no rain. This slippery surface can lead to the need for assistance from another person, limiting independence for wheelchair users. To address this concern, Participant 3 recommends implementing a non-slip type of surface for the ramp.

On the other hand, Participant 1 addresses the safety concerns within the bus stop area. He points out that the shelter is prone to leaks, especially now due to the new flat roof design. Additionally, people often seek shelter under the bus stop using umbrellas, leading to slippery pavement. To counteract this, Participant 1 proposes using a rougher type of pavement in the bus stop to minimize the risk of accidents and falls.

9. You're waiting at your usual stop, and you want to go to a location you've never been to before. You would like to obtain information on the best way to reach your destination (bus line number, transfers, estimated travel time, etc.). How would you like to access this information?

Insights: Participant 1 emphasizes the lack of information about transfers at bus stops and onboard. Participant 1 suggests providing information about available connections both at the stops and on the bus (visual and auditory information), as in the metro.

Participant 2 remarks that sometimes there is some information offered about the stops inside the bus, but the screens are not reliable and do not always work, or sometimes they just show advertisements.

Participant 3 draws attention to the challenges faced by wheelchair users, who can't see the screens properly, and they get nervous because they don't know where they are. His companion also highlights that they need to rely sometimes on external apps like Google Maps to figure out the current stop and how far they are from their destination.

In a nutshell, it is proposed to display itinerary and real-time bus location on screens. Addressing these issues can enhance passenger experience, making public transport more accessible, reliable, and informative for all.

10. It is Fallas and the bus line you usually take for your daily chores is overwhelmed by crowds of people. How do you think this situation can be improved?

Insights: Firstly, Participant 2 points out that she has never been able to understand which bus stops are closed during Fallas, or the route changes. This information should be provided not only on the EMT website but also at the actual bus stops.

On another note, concerning the issue of overcrowding on a bus or at a bus stop, Participant 2 mentions the additional stress it creates when she is with a baby stroller. She would like the option to enter the bus through the middle door when carrying a stroller and be informed if the designated stroller space is already occupied before boarding a crowded bus (for example, through a visual indicator). Apart from these small improvements, she sees no other way to address overcrowding than to increase the number of buses during peak demand.

Participant 1 also agrees with Participant 2 and highlights that people with disabilities hesitate to board a very crowded bus. He also sees no easy solution to overcrowding, except for introducing many more bus lines. He also agrees with Participant 2 that it is not easy to find out which lines are affected or the changes in bus stops during Fallas. Participant 2's proposed solution would be a good option.

Challenge Joker

Insights: On one hand, Participant 1 expressed his discomfort with ticketing inside the bus, as he told us. With one hand holding his cane and the other grasping the handrail, he cannot handle the ticketing process.

On the other hand, Participant 2 expressed her frustration with bike lanes that intersect between a bus stop and the bus. Many cyclists or scooter users pass without looking, ignoring the stop signal while the bus is at the stop. She suggests carrying out a risk analysis of the bus stops and making modifications to these stops to avoid such situations.

Finally, Participant 3 requests an improvement in the service for wheelchair users.

A.7 Mannheim

Measure: MAN_04

Game Objective: To evaluate what "an attractive, accessible, safe, comfortable, multifunctional and clean public transport stop" needs?

A.7.1 MANNHEIM GAME SESSIONS

Session 1 & 2 (The questions remain the same for each session. Due to the individual content and process of the serious game, it makes more sense to bundle the results.)

Date and Location: 04/09/2023. Dynamostraße 17, Mannheim

Number of participants: 1st Session 3, 2nd Session 4

Target groups represented: All users, vulnerable groups.

Challenges discussed:

1. The S-Bahn does not run and there is a rail replacement service.

Aspect: Attractiveness

Discussion: It is important to be able to locate the replacement service. Further be able to locate the digital passenger information clearly. This aspect is especially important when the stop is busy, such as after a performance at the National Theatre.

Solution: The Digital passenger information should provide the information where to find the replacement service. In special cases like the “National Theatre scenario”, there could even be a digital passenger information system inside the theatre to provide information regarding departures in real time. Allocating passengers by providing staff to relay information about the replacement service was also evaluated as a good solution.

2. You want to take public transport home after work and you're in a hurry?

Discussion: It is very important that traffic lights are not the reason for missing your connecting bus or tram.

Solution: Traffic lights that give priority to PT must be created here.

3. You've broken your leg; you're walking on crutches, and you want to take the tram. However, the elevator is defective, and you can't get to the platform level.

Aspect: Accessibility

Discussion: Is there an elevator at the stop? What other aspects might affect a mobility-impaired person?

Solution: Stairs can only be used by people who are very mobile and can get to the platform level despite limitations (e.g., a broken leg). Other obstacles such as crossing tracks were classified less as a problematic accessibility aspect than as a safety aspect. If there is no elevator one might have to use another PT stop.

4. You are traveling with a stroller and a toddler. To get to your tram, you have to cross the rails.

Aspect: Accessibility

Discussion: If you have a toddler and a stroller with you, you are usually very limited in your movement. You also often need more time when boarding the streetcar.

Solution: You can mark the entrance area at the stop where access to the tram is easier and provides more space to strollers and/or wheelchairs. This way, people with strollers, walkers, luggage, etc. can already stand in the appropriate place at the stop. This makes entering the tram easier.

5. An aggressive person is waiting at the bus stop, and there are no security guards.

Aspect: Safety

Discussion: How must the station environment be designed? Cameras and SOS buttons (e.g., PT stop Dalberstraße) offer little sense of security.

Solution: The escape route to both sides of the station and the “good visibility into the PT stops” are particularly important. The PT stop environment is also described as an important factor in such a situation. If the surroundings are lively, the feeling of safety is greater. Stops that are underground are rated as more critical.

6. You're alone at the bus stop in the evening, it's dark and you're waiting for your train.

Aspect: Safety

Discussion: When does which person feel insecure. A greater sense of insecurity at night is felt by women and presumably by people with limited mobility.

Solution: The stop must be easily visible and, of course, properly illuminated. People also avoid stops that do not offer a “feeling of safety”. The footpath is considered "safer" than going to an underground stop with camera surveillance. Announcements and (security) staff at the stops could help in those scenarios.

7. You're standing at the train station and it's pouring rain. The train is delayed and because of the school children there are not enough opportunities to shelter.

Aspect: Comfort

Discussion: Where can I find shelter when it rains? What if I have an important meeting cannot arrive at work wet?

Solution: Especially trees as a possible protection from rain, as well as larger passenger shelters were evaluated as positive.

8. You stand at the bus stop and wait for the bus. It's summer, and the temperatures are very high. In addition, the sun shines very strongly, which can lead to heat strokes.

Aspect: Comfort

Discussion: What do you do when it's hot? You want to take shelter, but what if the passenger shelter is already occupied?

Solution: The greening of the bus stop was rated as very important. The greening can take many forms such as: Grass area between the rails or on the bus stop roofs. This can bring shade and a cooling of the outdoor climate.

9. You arrive at the station and don't know when your connecting train will leave.

Aspect: Multifunctional

Discussion: The digital passenger information must be clearly visible. Walking distances must not be too long, especially between stops. Especially, when they are staggered on two different sides (e.g., PT stop National Theatre).

Solution: More access points to stops could be created (e.g., PT stop National Theatre) and the digital passenger information should be clearly visible.

10. You're tired and want to sit down at the stop, but all the chairs are dirty, and the floor is dirty.

Aspect: Cleanliness

Discussion: Is cleanliness so important at all? Isn't it much more the smell that triggers a feeling of cleanliness?

Solution: One can also offer the possibility to build "leaning facilities/cleaning chairs" at the PT stop. They take up less space and offer a way to shelter from traffic (e.g., Planetarium PT stop).

A.8 Lisbon

Measure: LIS_06 “To improve comfort, convenience and safety of PT interfaces”

Objective: Some PT interfaces and bus stops are not accessible to all users (both inside and when approaching the interface) or lack the proper information to aid its use. What are the main challenges to address to make them more inclusive?

A.8.1 LISBON GAME SESSIONS

Session 1

Date and Location: 12/09/2023, Lisbon

Number of participants: 5

Target groups represented: 1 adult with cerebral palsy, 1 adult with autism, 1 adult with blindness, 1 adolescent without disability, 1 adult without disability.

Challenges discussed:

1. I usually make my commute from home to work by bike. It's early evening and I punctured a tire. My house is served by metro and buses.

Main points of discussion:

- The underground doesn't allow bike transportation at rush hours.
- People don't agree that you get on public transport with bicycles.
- Most of the bus ramps are broken down.
- There is the problem of transporting the bike on the stairs to achieve the underground.
- One participant mentioned the need of a specific transport for the disabled, but the others did not agree, because this goes against citizenship rights and inclusion.

Solutions:

- Buses should have supports in front or behind for the transport of bicycles.
- Carry the bike on the bus attached to the bus with a chain.
- All public transport should be adapted for people with disabilities.

2. The route I must take has information available with a certain colour palette. However, I am colourblind and cannot distinguish any relevant information.

Main points of discussion: A while ago, the underground had maps with relief in the stations, but they were removed and not replaced. These maps were very useful for blind people.

Solutions: Maps should not depend on colours alone. Use symbols in addition to colours or different dashes when drawing lines. There is a Portuguese colour identification system for the colourblind, registered with the trademark ColorAdd. The code is not yet universal, but it should be. On maps, symbols should be placed at the origin and destination of the line and at the intersections.

3. I'm a foreigner, I don't speak Portuguese or English and I'm blind. I want to travel on public transportation, and I need to know where the stop is and to know about the lines and schedules.

Main points of discussion: Operators' websites and applications must be accessible, by law, since 2018. The problem is the transport terminals, where there is no information for blind people. In Canada, for example, there is an application that allows, as you walk on the boarding piers, to hear the indication of the number of the stop and its destination. For the blind people, who travel by bus, the "Moovit" app solves the problem of indicating the stops you're going through.

Solutions: There should be a support service at each station, such as a device that translates automatically. The operator must provide information on an accessible website, which works well on both the computer and the mobile phone, and the blind person with appropriate application reads the website. In the interfaces there should be outdoor navigation systems available.

4. My house is situated nearby a construction work that is starting and will last 6 months. The route and bus stops took a big detour. I have a permanent injury and need to commute to work on public transport.

Main points of discussion: Sometimes the information of transport service changes is placed on paper on the buses, but blind people do not access them.

Solutions: Warn people by placing papers at the stops of the affected place and in an application, to serve blind people as well. The information must be clear about the construction works and about the changes of the stops and routes. When information about transport service changes is on paper inside the bus, drivers should be made aware to provide this information to the blind people that´s entering. The increasing turnover between drivers loses much of the human relationship they establish with the service users, so it would be better to reduce this turnover.

5. Tell us about a difficulty you had in an interface/station/stop of public transport!

Main points of discussion: The bus does not arrive at the time marked in the application. Sometimes the time that is announced in the application is not the real time, but the planned time and. It´s necessary more care with the announced time because there is the problem of blind people getting on the wrong bus. For those who move with more difficulty, it is important to know the real arrival time of the bus, to move in advance.

Solutions: Ensure that buses GPS are synchronized, so that the announced arrival time corresponds to the real time.

Session 2

Date and Location: 12/09/2023, Lisbon

Number of participants: 4

Target groups represented: 1 adult with deafness, 1 adult with blindness, 2 adults in wheelchair,

Challenges discussed:

1. On the way to the station there is a street with narrow sidewalks and many cars passing at high great speed. You are afraid to let your child go alone to the school on public transport because he must use and cross this street.

Main points of discussion: Attention is needed to the width of streets and sidewalks, pedestrian roads and roads dedicated to public transport, the types of roads pavements and to the pleasant and comfortable spaces of rest, which bring more children to the street.

Solutions: Reduce the street width, increase the width of the sidewalks, increase the number of pedestrian roads, and increase the number of roads dedicated to public transport. Put guards to protect the sidewalks, ensure the vehicles speed control and put traffic lights. Public space designed for people first and only then for the rest, with care in the choice of floors, public facilities that provide rest (benches and trees), that make the public space more comfortable.

2. Sound signals in the underground are not perceived by deaf people.

Main points of discussion: When you are inside the underground and there is some unforeseen problem, this is announced verbally, without the deaf being able to realize what is going on and what to do, which is very stressful, particularly when you have claustrophobia. Waiting times and unforeseen events are very difficult for blind people, especially in areas they do not know, because they don´t know where to go or what alternative transport options they have. In the underground we could see tactile floor and now we don´t see it as much as before.

Solutions: Whenever during an underground trip there is an unforeseen problem, in addition to being announced verbally to travellers, it must also be communicated in writing on the operator's website, so that deaf people can access it through their mobile phones and know what they should do. There should be someone at the box office who could help.

3. I must go to a bus stop that has no paved sidewalk leading to it, and with the rain, is full of mud. I feel like complaining about the situation and I don't know how....

Main points of discussion: Sometimes the bus-stops shelters don´t protect people from the sun, rain, and wind, they are just advertising pieces. When they are made of glass, they create a greenhouse effect, visible in the summer when people wait for the bus behind the shelter.

Solutions: At stops where the problem is recurring, increase the coverage area of the stop and increase the number of career circulations so that it does not accumulate too many people at the stop. The shelters must have the schedules and information about the real time of bus arrival, with visual and audible warning.

4. Passenger information.

Main points of discussion: Information is required at stops and in vehicles. Information on the next stages of the journey is also required, after changing transport modes.

Solutions: Make the information available in an application, with real-time indication. Include in the information provided in an application, the indication of accessibility to interfaces, indicating its accessibility, if so, what conditions are offered.

6. My house is situated nearby a construction work that is starting and will last 6 months. The route and bus stops took a big detour. I have a permanent injury and need to commute to work on public transport.

Main points of discussion: Road works should be warned in advance because for deaf people it's hard to ask and notice what other people already know. People at the ticket offices are not always available to give information. There are stops on national roads that are unable to access them. On the underground there are people who sit on the stairs and cause problems to the blind by not seeing them. Also, the alteration of the senses of the escalators is a problem for blind people.

Solutions: Provide notices about the updating of accessibility conditions (website, newsletter). Send e-mails to the Parish Councils and municipalities, to claim access to the stops and to treat the stops with respect. To prevent people from occupying the stairs in the underground, seated, place tactile floors in a section of the stairs so that people realize that it must be unobstructed, because it is dedicated to blind people. It´s important to report the problems so that they can be resolved.

7. I'm a foreigner, I don't speak Portuguese or English and I'm blind. I want to travel on public transportation, and I need to know where the stop is and to know about the lines and schedules.

Main points of discussion: There should be someone to accompany the stranger or a place where he/she could ask for help.

Solutions: For blind-deaf people there should have specific solutions, which may include Braille, because although they are a minority, they exist. They don't see or hear, but they feel. So, there should be sensory indications. People must have a good attitude towards people with disabilities. Scan maps and, from a tactile point of view, indicate essential points, making it accessible. In London, three-dimensional maps of the stations indicate the entrance door of the train. It´s important to have simulation activities for people with all types of disabilities, on a trip or in an interface, pointing out the concrete cases that don’t work.

A.9 Hannover

Measure: HAN_03: Added-value services in multimodal nodes to integrate Public Transport with active modes

Game Objective: We decided to play the serious game with reference to the bike tower and the resulting path chains. It is interesting to consider the link between the bike tower and the train station in Wunstorf and the resulting multimodal route chains. So, within the serious game, not only the function of the bike tower can be considered, but also its classification in path chains.

Since Wunstorf is our lighthouse municipality for the implementation of various projects within our mobile network, this location is ideal.

Challenges: The challenge cards have various focuses. Some of them focus on the bike tower and the information provided about it, but there are also some that deal with the train station and the area around it. We want to make our challenges as diverse and open as possible in order to cover as many aspects as possible. We want to get in touch with people within the serious game and motivate them to talk and discuss about their needs and wishes through the challenge cards.

Both, the challenge cards and the game board were designed and produced especially for the serious game by our design team. In this way, we have ideally adapted the game board to our regional conditions.

A.9.1 HANNOVER GAME SESSIONS

Session 1

Date and Location: 16.08.2023, Wunstorf Bike Tower

Number of participants: 5

Target groups represented: mixed

Challenges discussed: We discussed all Challenge Cards. In order to secure the results of the challenges, we noted the ideas on sheets of paper and sorted them by topic. All topics relating to the bike tower and its surroundings were noted in blue, and all topics relating to the train station and its surroundings were noted in green.

Summary: The first game session of the serious game was very interesting. We were able to test the game board and the challenge cards very well. We also tested the game piece we had designed ourselves.

We got different insights into the thematic fields of the station/station environment, the bike tower (overarching) and the accessibility of the bike tower on site. The feedback, especially through the challenge cards, was very diverse. The most important comments in this Game Session were the contact options in case of technical problems with the

tower, the accessibility (presenting the functionality in easy language, with suitable pictures and videos or pictograms etc.) as well as the facilities of the station. Clean toilets, a pleasant station environment with quality of stay and alternative access to the platform level (besides the stairs and the lift) were desired.

Session 2

Date and Location: 17.08.2023

Number of participants: 10

Target groups represented: people with limited mobility/ disabled people and one elderly person

Challenges discussed: Also in this game session we talked about all Challenges. The needs and focus, however, were different from the previous day. It was interesting to see what infrastructures were needed in the mixed group and in the group with mobility impaired people. A big topic in the second game session was the provision of a toilet in the station area, as well as the explanation of the bicycle tower in easy language.

Summary: In the second game session, we also received feedback on various thematic areas. Sometimes even other topics were addressed through the challenge cards, because we got into a conversation with the participants. The simple design of the game board and the whole game structure made the serious game very accessible also for the group of people with disabilities. Already during the explanation of the functioning of the bike tower on site at the tower, first fears about the function of the tower could be taken away.

The wishes and suggestions were different from those of the first game session. For example, people wished for larger lifts (to the size that a bike could easily fit into them) or more non-slip surfaces. But the missing, clean toilets were also a topic of discussion at the second session. The corridors in the station should be wide enough, and curves should be easy to see. Places where accidents have already happened were also mentioned - these should be defused. Good, simple information signs are important, as well as loud loudspeaker announcements and assistance with rail replacement services.

Regarding the bike tower, it was noted that the utilisation of the tower should be visible in the app in any case. There should also be an alternative to the app, because not everyone has a smartphone. Pictures for explanation were desired, as well as a camera to strengthen the feeling of safety. Louder loudspeakers were also wished for there, as well as easy language in the descriptions. In case the tower is not functioning or full, it was noted that there should be secure, covered parking facilities - in addition to the existing ones. Delays of trains or their departure time in general should be displayed on the tower. Finally, it was noted that there should be support for the accessibility of the tower (e.g. a hotline or service days where someone is on site and explains).

A.10 Budapest

Measure: BUD_03: The aim of this measure is to understand connections in service level and passenger satisfaction. Therefore, this measure was selected for the Serious Game in order to make the measure specification more accurate and clearer. The main focus of the research was declared to be the combined transport habits of people and modal change patterns.

Game Objective: The main purpose with the two focus group research groups was to explore the travel patterns of those who typically travel by combined transport modes, get to know their travel habits and the decision-making mechanisms behind mode changes in a more complex way. The problems that arise during different travel situations could be understood in a better way, along with the information of how they are currently being solved by different people.

Challenges: Our main challenges during the Serious Game included the accurate mapping of the arising challenges, obstacles, habits and decisions related to combined transport.

A.10.1 BUDAPEST GAME SESSIONS

Session 1

Date and Location: 22.08.2023 - BKK Office Building, Budapest

Number of participants: 6

Target groups represented: Mixed people with various transport habits, from various age groups

Summary of challenges discussed:

The participants had different transport habits, however similar characteristics could be found within the same age groups, such as the high rejection of car use within the urban areas. In terms of using private bicycles or shared bicycles, no consistent logic was found among the participants due to the different aspects they preferred (safety, storage etc.) However, the use of public transport services was quite popular, as a higher share of the participants claimed to use PT services regularly in their everyday life. Private car usage was only typical in situations, where heavy or a larger number of luggage was needed to be transported or if users were required to take larger distances (outside of the city centre area).

Session 2

Date and Location: 24.08.2023. – BKK Office Building, Budapest

Number of participants: 6

Target groups represented: Mixed people with various transport habits from various age groups

Summary of challenges discussed: The second group mainly included primary bike users, who only shift to public transport services or private car, when it comes to extreme weather conditions. Their family background and residential location encourages them to use private car in some occasional situations, however they never use it in the city centre area. The BUBI shared bike system is regularly used by almost all of them, where it is available, while e-scooter use was highly rejected by all of them. Using combined and different transport modes within a return journey was more specific among the participants.

Main areas of convergent or divergent ideas for both sessions:

- The allowance of carrying bicycles on metro lines and on all tram vehicles
    - Pro: In areas, where no micromobility services are available, private bicycle would be an option, if it could be taken along with the user and could be transported on PT vehicles in some intermediate sections of the travellers, enabling them to take the first/last miles on the bike, thus the destinations could be reached within a shorter time.
    - Contra: It could be disturbing for some users to carry bikes on particular vehicles (especially during peak hours), which could be a great source of conflicts against other transport users (e.g transport users with a wheelchair or with a baby stroller)
- Shared monthly pass within a household – non-concurrent use
    - Pro: It would be beneficial for person within a family/household, who does not have as many needs for travelling – At the moment, it is not worth it for them to purchase a monthly pass individually, because they would not travel as much. If a family travels together, they prefer to do their trips by car, because it

is more affordable and practical for them. Whereas if there was a ticket that could be used between them on different days, some participants would probably purchase it

    - Contra: it would be difficult to check whether the pass is actually used by the authorized person.
- Using shared e-scooters. Expanding the locations of micro-mobility points (critical from the user's point of view for door-to-door access) – where could micromobility trips be finished and vehicles be placed.
    - Pro: From the user's point of view, the introduction of a similar system would be both advantageous and convenient because the trips could be started and finished at any time, any place. Less walking would be required with more flexible opportunities, fulfilling door-to-door needs and coverage.
    - Contra: if there are no designated dumping places, then these free-floating devices would park in an irregular manner, occupying public space, irregularly.
- Discounted ticket purchase with a traffic license
    - Pro: Car users would use public transport service more frequently.
    - Contra: Users not owning a car at all would be totally excluded from this discount.
- Free parking with a BKK ticket/pass
    - Pro: Users would be gained with the opportunity to leave their car somewhere and switch to public transport to relieve the burden on the city centre areas.
    - Contra: There is a probability that car dependency would be higher.
- Integrating MOL Bubi shared bikes into the monthly Budapest pass
    - Pro: The integration of the use of MOL Bubi shared bike system would provide a more convenient and easier way to transport in Budapest, as no different tariffs and purchases would be needed to be done and paid.
    - Contra: Only people with a smartphone and mobile data would be able to use the product.
- Pre-booking option of Bubi services
    - Pro: It would support the predictability of the system to make sure to be an available bike,
    - Contra: It would reduce the possibility of spontaneous trips.

A.11 Rome

Measure: ROM_08: Designing the urban space to promote active travel modes, PT and environmental 30 Km/h zones

Game Objective: The objective was gaining insight on the vulnerable road users (elderly people) point of view, involving them in a discussion on what the problems to move around the borough are and how things could improve from the seniors' perspective.

Challenges:

1. What are your mobility needs
2. What can be improved
3. PT - accessibility and tickets

A.11.1 ROME GAME SESSIONS

Summary of challenges discussed: The session actually did not need facilitation, as the mobility matter is very much felt by the participants. Their daily journeys are mainly walking distance to reach the market, the seniors centre etc.

Elderly people's mobility needs are mainly located within their borough, and shifts are made on foot when possible.

The main concern is the sidewalk's pavement which is not smooth and makes walking difficult. They also complained about maintenance of the green, positioning of the garbage bins which make moving difficult, especially for those who are mobility impaired.

The participants also focus attention on the lack of the pedestrian crossing and ramps for disabled people. Where the ramps are present, sometimes they are flooded.

Concerning car traffic they're happy about the traffic calming measures implemented in the "30 zones", however high speed still remains on some boundary areas still an issue.

They discussed the role of the urban police and of the officials that must guarantee rules are respected. The authority of policemen, bus drivers, and public officials isn't as effective as it used to be. Often safety around the schools is guaranteed by local associations (grandparents).

Concerning the accessibility to PT, they noticed that the capillarity of the PT network is much lower than in the past. They need to walk more to reach the PT stops. In addition, one bus is not enough to reach the city centre, at least one connection is necessary, which makes journeys more complex. However, although they mainly move on foot inside the borough, when they go further take advantage of PT. In fact, they found it positive that with the reserved lane on Via di Portonaccio it is possible to quickly reach the Tiburtina Station by bus (3' vs 30'). On buses the disabled footboard is missing or not working properly.