

# Accessible Routes: communicating accessibility

Creative Commons CC BY 4.0 2021

Eve Nieminen

Esko-Matti Helin

Diana Bécares Mas

Fengyu L

Design for Government course at Aalto University

<b>Introduction</b>	<b>3</b>
<b>Research Method</b>	<b>4</b>
Desktop research and background readings	4
Project kick-off	5
Interviews	5
Systems analysis	10
Affinity Diagram [from interviews]	14
<b>Research Findings</b>	<b>16</b>
Identified pain points	16
Reframing the brief	16
Mobility services process	17
User journeys / “Service blueprints” of journeys	
<b>Ideation Process</b>	<b>19</b>
Design drivers	19
Leverage points	19
Types of Intervention	22
Ideation workshop [with the class]	22
Brainstorming	24
Defining the concepts	25
Validation workshop	25
Narrowing down [choosing the final concept]	28
<b>Final Proposal</b>	<b>29</b>
Problem storytelling	29
Concept 1 – Accessible routes -filter	31
Service concept development	32
Customer journey	33
Prototype	34
Concept 2 – Accessibility alerts	35
Service concept development	35
Customer journey	37
Prototype	38
<b>Conclusion</b>	<b>39</b>
<b>References</b>	<b>40</b>
<b>Appendices</b>	<b>41</b>

# Introduction

Our group was commissioned to work with the pilot on personal budgeting and mobility services, taking place this spring of 2021 in the municipality of Espoo, which aims to improve the transportation services used by people with disabilities.

Our initial focus, and what was asked in the brief was to investigate the needs of different user groups and then map out possible future service paths.

Municipalities in Finland provide mobility support services for people with disabilities. The aim is to guarantee all people an equitable freedom of mobility. The current system is inflexible, high in carbon emissions, and resource-consuming. Our team has aimed to find a way to solve this by finding how we could make public transportation a relevant option for people with disabilities. Nowadays, these users of mobility support services take most of their trips by taxis because the public transportation system does not always support accessible travel. For this reason, one of the project objectives is to increase the use of public transportation with the multimodal journey model, where the idea is that the user would take the suitable parts of their journey by train or bus.

Within this brief, we were working in close collaboration with the municipality of Espoo, THL, Kela, and people with disabilities that use the mobility support services and agreed to cooperate with us. Throughout the first two weeks of the course, we had the opportunity to reach several people with diverse disabilities who wanted to participate in developing our project, which was vital, seeing as the core of the project is to make the mobility support services as convenient as possible for the users.

# Research Method

## Desktop research and background readings

Together with the brief, there was a set of background readings attached to provide extra context. From those, we would like to highlight the following gathered information:

Starting with the news article about Cleanliness targets for public procurement vehicles [2019], which stated that the EU has set an amending directive to promote the share of clean and energy-efficient vehicles in public procurement and transport services with set targets for two procurement periods, the first one ending in 2025. For this the ministry of Transport and Communication started preparing a legislation to implement it in Finland in 2019.

The second document was “THL:n työpaperi: Kuljetuksesta liikkumiseen [2014]” – a report that features a study in which the replies from municipal respondents and from customers with disabilities are compared. In this study, the users of public transport stated that they wanted to improve the flexibility of travelling and objected to the limitations of the current travel areas. From this report we found our interest to develop the accessibility in public transport.

Another article addressed the accessible ride-sharing system for people with disabilities in North Karelia. This ended in 2009 because the cost for the Ministry of Transport and Communications was 300.000€/year. However, changing to personal rides increased the costs for Kela and caused additional expenses for the municipalities. Back then, there was a march organized to defend the carpools, and people collected signatures to get the service available again.

This article was a way to emphasize how users with disabilities - in North Karelia - appreciated the service, being comfortable sharing rides with other people, which the municipalities aim to propose as a future implementation.

Through these background readings, we also had an introduction to Kulkukeskus, the transport centre that provides accessible taxi rides. They have been operating in Espoo since last February, and this will start operating in other municipalities throughout Western Uusimaa during this spring.

## **Project kick-off**

In the second week of the project our supergroup facilitated a roundtable discussion with key stakeholders. The stakeholders included representatives from the ORSI research unit, Kela, city of Espoo, THL, and the Ministry of Health and Social Affairs. From our supergroup, we appointed two people facilitators, two people note takers, and prepared a discussion guide with a set of questions to ensure we use the time effectively. The aim of the round-table discussion was to bring all stakeholders together and build a foundation for collaboration, as well as give a chance for us students to ask questions on the brief.

From the roundtable discussion we learned that the reformation of mobility support services is already in motion and that our project runs in parallel with the kilometer wallet pilot in Western Uusimaa. Since our project brief was focused on the mobility services, and since there already were some concepts developed (such as the km wallet) we learned that our project should complement the work already done, and ideally offer some insights from the user perspective to help with the further development of the services.

## **Interviews**

We interviewed four users (names changed): Mary, Mia, Tommi and Jaana

Mary has a congenital visual impairment and has a disability pension. She uses taxis 18 times per month, has HSL tickets, and has an assistant. Some of her opinions on the current mobility system are:

- Getting around by taxi is much easier than with public transport, because it is less stressful, and makes users independent of the assistant.
- Free HSL tickets are a good addition, but she still needs an assistant for that. On the other hand, it is difficult to get personal flexibility.
- When it comes to using Kulkukeskus, from the user-friendly perspective, she believes waiting times should be shorter and the pre-orders should be completely accurate.
- For a leased car, she thinks commuting would be uncomfortable because it would require an assistant to drive.
- About the comparison of environmental sustainability and flexibility, she values the environment but prefers to implement it in other areas of life.
- The ideal mobility solution for her would be a working taxi system with a kilometer wallet or a leasing car with additional taxi rides.

Mia is on a disability pension and she has an assistant for 2-5h/week. Her daily transport routine is that she uses an electric moped for shorter trips like grocery shopping, a taxi & moped for longer trips. Her assistant is needed for carrying heavy stuff or when going to new places.

She has been using the km wallet for years, and she gives very positive feedback for that. However, she also pointed out the limitations:

- Km wallet brings more responsibility for the users, as they have to calculate trips themselves because there is no technology to calculate.
- Furthermore, the 3-month validity was too short because there is a variation in usage of kilometers in different months. The 6-month validity is better, then the user can use more kilometers in some months and less in others.
- For the public transport, her opinion was that she would try public transport if it was cheaper.
- In the taxi services, she appreciates the efforts that the municipalities have made although she would hope to have more leisure taxi journeys.
- In the km wallet, she enjoys the fact that she can travel across the municipality borders. This is not possible in the current mobility system.

Tommi has a physical impairment, and currently he is incapable of working. He has not used the km wallet yet. Currently, he uses the taxi service through Kulkukeskus, before this, he had a taxi card.

- He thinks a limitation of Kulkukeskus is that users need to plan with anticipation, while taxi card users can take any taxi and show the card. Yet, he thinks one advantage of Kulkukeskus is that there is no need to talk to anybody and the users can plan a ride through it beforehand.
- He can not use public transportation due to his severe physical condition. To be able to change transportation he would need to walk which would be an issue for him, so he requires taxis.
- He has not tried the km wallet yet, but he believes it gives the users more freedom of planning how to use trips.
- The best mobility solution for him would be a leased car.
- He has also considered multimodal transportation (combination of taxi and public transportation), which is still better than using only public transport.
- For sustainability, he thinks the carbon emissions coming from the taxi services are minimal and won't make a difference.

Jaana has a visual impairment and lives in Western Uusimaa. She is unemployed and participates in an association for blind people.

- She has seldom used the Kulkukeskus services without assistants. She said it worked fine, but she wouldn't generalize. She thinks there are not many cars available in Kulkukeskus, and she knows people do not like it because they feel it limits their freedom. But she praised the waiting time of the taxi.
- About HSL, she commented that they have good transportation standards, although she thinks the timetables aren't accessible for the blind [it should show in any way other than reading]. Also, there are no announcements in speakers at bus stops, so she can only use public transportation with an assistant, however, she can't always be sure that she gets an assistant to help.
- About the Km wallet, she was very positive, the only criticism was that users control their km, so they can forget to note them.
- Talking about multimodal transportation, she found it made sense for long journeys, and that it would still be hard to use public transport.
- She insisted that people's movement shouldn't be targeted for environmental reasons.

To be able to comprehend the perspective from the government's disability services, we interviewed some social workers.

The first interviewee was working in Espoo. She said the current system limits the taxi services access area to the customer's home municipality area. She described the availability of taxis as limited, especially in areas far from the city center. She estimates more flexibility is needed in the whole disability mobility services. In her municipality, the three km wallet pilot participants have given positive feedback. In terms of the multimodal routing model, the difficulty is that many disabled people would need assistants in public transport, and the assistants would have to pay for their ticket. Besides, countryside places have worse public transport than city centers, and most of their customers live in countryside areas. For the km wallet, she would want to have a system to support tracking the kilometers. Currently, the pilot users count their kilometers manually into excel sheets.

We interviewed another social worker from Espoo. In her work, she decides whether a person with disabilities gets mobility support services or not. She thinks the number of taxi rides (18trips/month) in the current system is not enough for many users. Regarding Kulkukeskus, she thinks the company has not delivered yet the technology [application] that is needed for the kilometer wallet [the app would calculate the kilometers used]. This is why the users have to use excel sheets to count their kilometers manually. There is a problem that the traveled kilometers might not correlate directly with the amount of money used. She thinks sustainability is an important value in municipality services. She said the routing

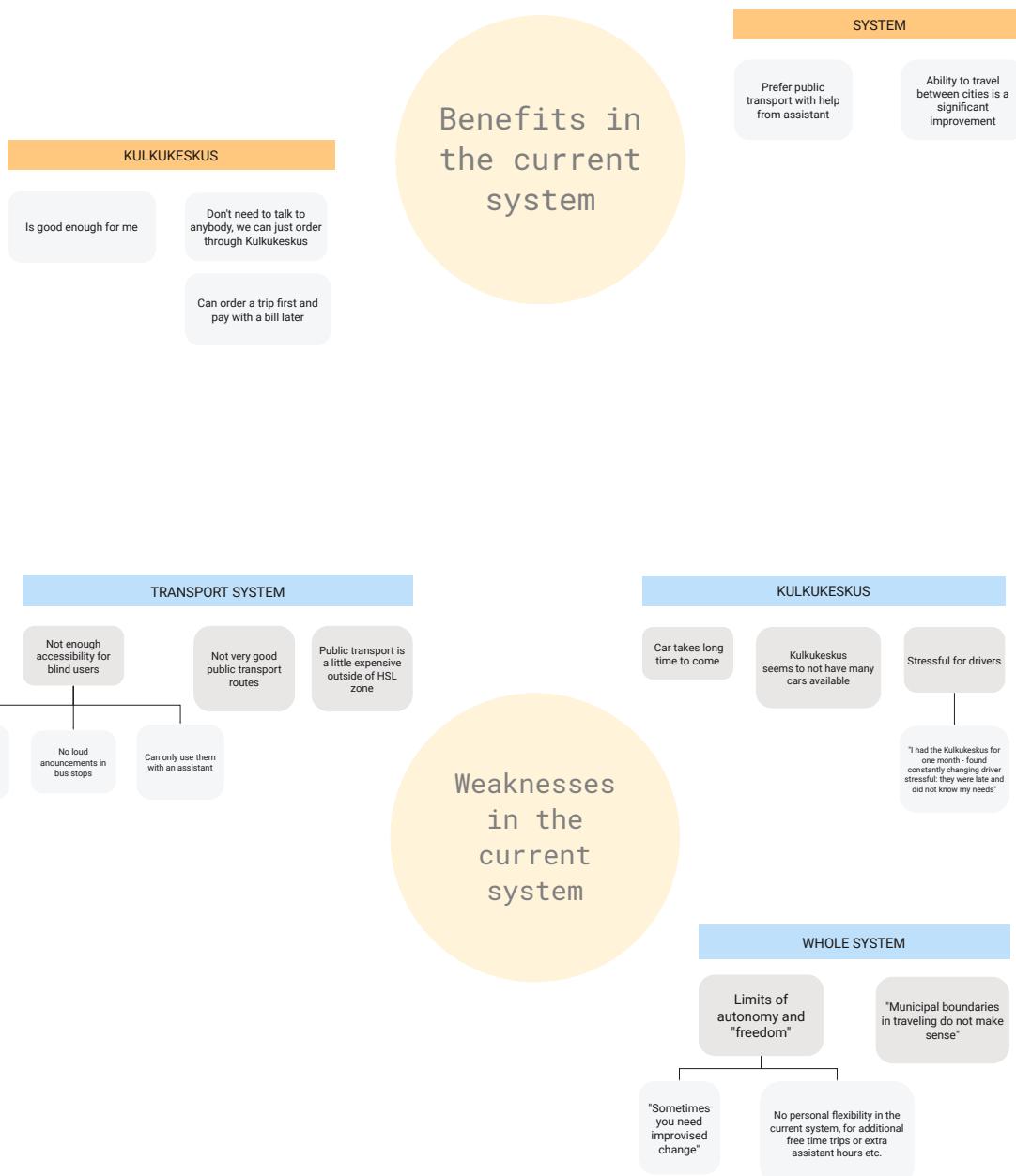
model is the key aspect of supporting the environmental sustainability of the mobility service. Currently, if a disabled person wants to travel part of the journey with a taxi and part with public transport the ticket is free. On the other hand, they would need to buy the ticket for their assistant - this should be changed. She thinks free tickets for the assistant could encourage disabled people to use public transport more.

Another social worker from Espoo was interviewed. She had noticed that due to Kulkukeskus, users had to adapt to not choosing their taxi driver, which has caused many complaints. About public transport, she stated the quality of public transport is strongly related to how close the person lives to an accessible public transport stops/station. She hoped public transport services would take better into account people with disabilities. She thinks it is difficult to find participants to test leased cars in a personal budgeting pilot. Most people who could drive a car, have already bought a car with the municipality support system. She thinks the idea of an assistant driving a car is good, but it might be difficult to find an assistant with a driver's license.

We also interviewed a social worker in Lohja. She said most disabled people can travel with a taxi without assistant's to support them, but many of them need help for e.g. shopping for groceries in a supermarket. She said that ordering a taxi with Kulkukeskus is challenging for users, because it has to be ordered beforehand, and spontaneous departures are not an option. She was glad that her municipality does not use Kulkukeskus, where getting a taxi is even more difficult. She told us that taxi drivers can be reluctant to take disability taxi rides - the payment is not as good as in other taxi rides. Her ideal solution would be to design an individual taxi ride plan for each customer's needs. This would increase the feeling of security and well-being.

We also interviewed the head of disability services of Espoo, whose role is to lead organizing disability services. She said she brought the idea of the kilometer wallet from the Netherlands, where they currently have a similar system. She thinks that personal budgeting is a way to improve the freedom to choose in disabled mobility services. She hopes the pilot would encourage the users to try different types of transports, including public transport. The option of using public transport would put people with disabilities on the same level as any other public transport users. Shared taxis for people who would have a similar route was presented as a future implementation. For sustainability, by combining taxis they can have less taxis, which would cause less pollution. About Kulkukeskus, she said that in the future it could give more priority to cars that are less pollutive. She also talked about the relationships between people and taxi drivers in the previous system. She understands the harm that people might have, when Kulkukeskus doesn't allow choosing drivers.

In the following diagram we arranged and summarized the crucial points from all the interviews. We organized the information collected from the interviews into groups and listed the positive and negative feedback.



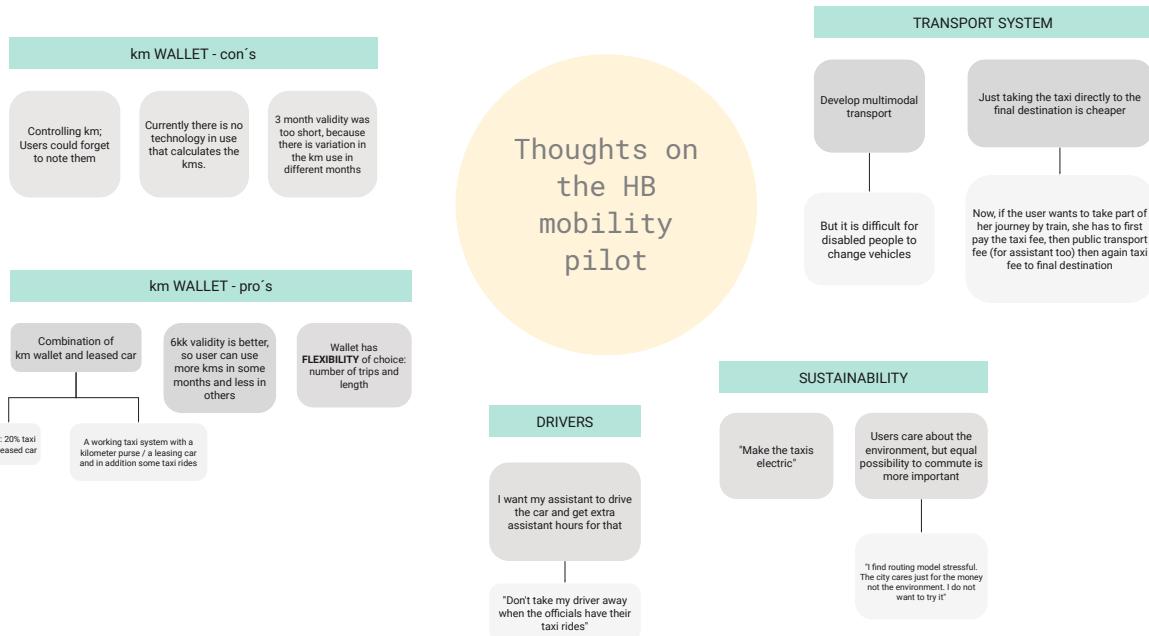


Figure 1. Interviewee's opinions on mobility services.

## Systems analysis

### CATWOE analysis

After gathering data from interviews and desktop research, we started to organise it with the help of the CATWOE analysis from Soft Systems Methodology. CATWOE analysis is a tool to help understand the perspective and impact different stakeholders have in a system. We listed all thinkable stakeholders and divided them into Customers, Actors, Transformation processes, Worldviews, Owners and Environmental constraints. We learned that the most important 'worldviews' of municipalities are mitigating carbon emissions, staying within the budget and providing good quality services, while the users naturally held the view that the quality of services should be the first priority.



Figure 2. CATWOE-analysis.

## **Systems map**

As we now had a preliminary understanding of all the elements and their relationships in the mobility support services, we visualised the information by making a systems map. The first iteration of the map was scattered and didn't illustrate the connections of the elements clearly. Then we edited the map by rearranging the different elements according to their power-relations. This gave us an image of a system, where the service-user - a person with disability - is at the bottom of the hierarchy with little or no power over how the services are managed. This map illustrated well the need for more user-centered design, which we later chose as one of our design drivers. However, this version put emphasis on national actors such as THL and the Ministry of Health and Social Affairs. Since our project briefly focused on the mobility support services that are provided on a local level, we needed a map that would show us a more detailed picture.

In the final version of the map we zoomed in and focused on the communication process that the service-user goes through as they apply for and use the mobility support services. This map highlighted effectively the lack of communication between the user and public transport providers. Eventually this was a key finding in our design process.

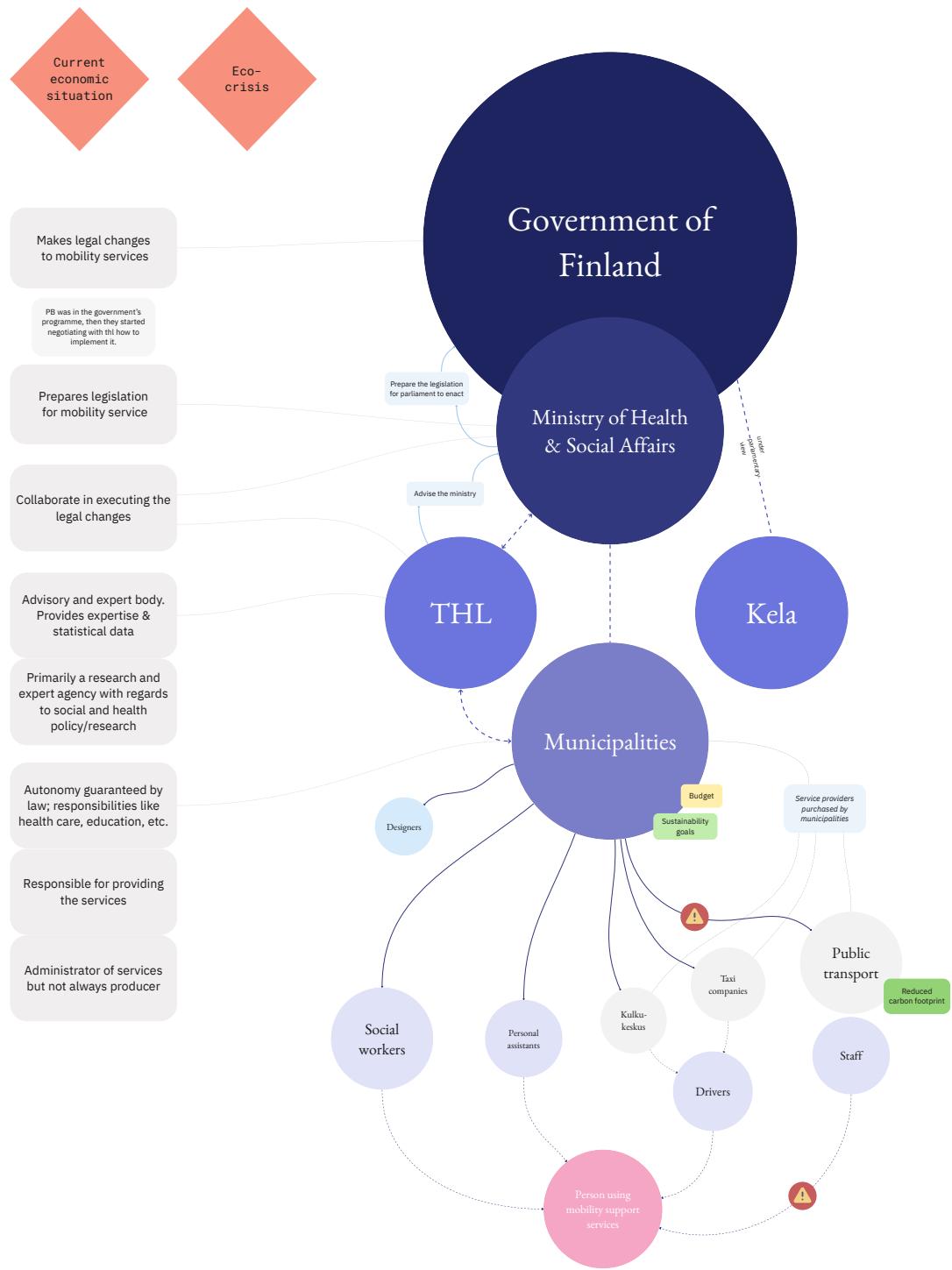


Figure 3. First iteration of systems map with all stakeholders

## Affinity Diagram (from interviews)

We also used an affinity diagram, a tool to manage and analyse data, to find commonalities and repeating themes from the interviews.

We used a Miro board for this activity. First we extracted each opinion or comment from the interview transcripts on separate Post-its. After this, we took time to rearrange the Post-its in clusters on the Miro board. After all Post-its were relocated into a cluster, we divided some of the biggest clusters into subtopics. Now we had all data from the interviews divided in tentative themes.

We actually did the affinity diagramming two times. Our group felt that after the first round we still couldn't draw good enough real insights from our interviews. For the second round we went through the transcripts again, in case some points had been missed, and took our time with sorting them into clusters. This actually resulted in a bigger amount of themes. Finally, we merged similar comments to get a neater map: now we had 6–8 pain points identified for each theme that we had identified from the interviews. We composed a How Might We? - question for each of these pain points. This activity gave us a big set of questions that really helped us identify the problem areas we wanted to focus on.

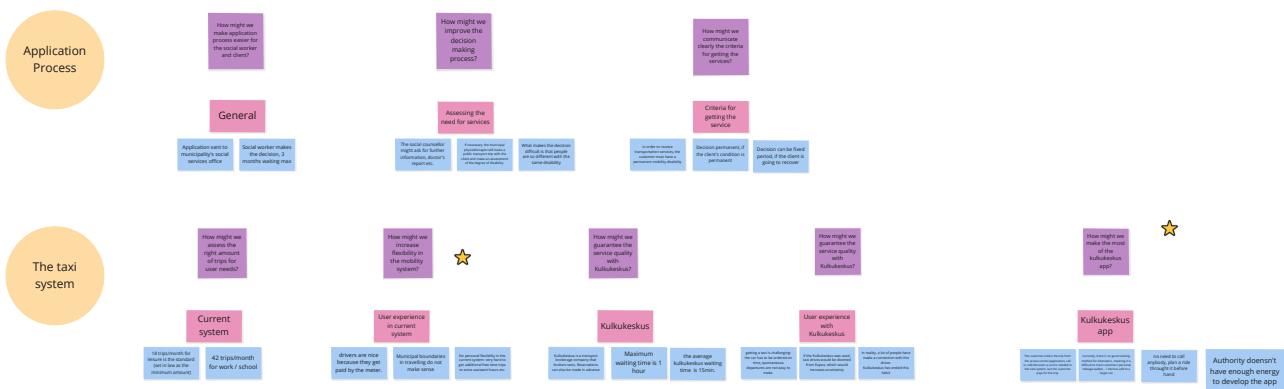


Figure 4. Part of the final Affinity Diagram with HMW-questions.

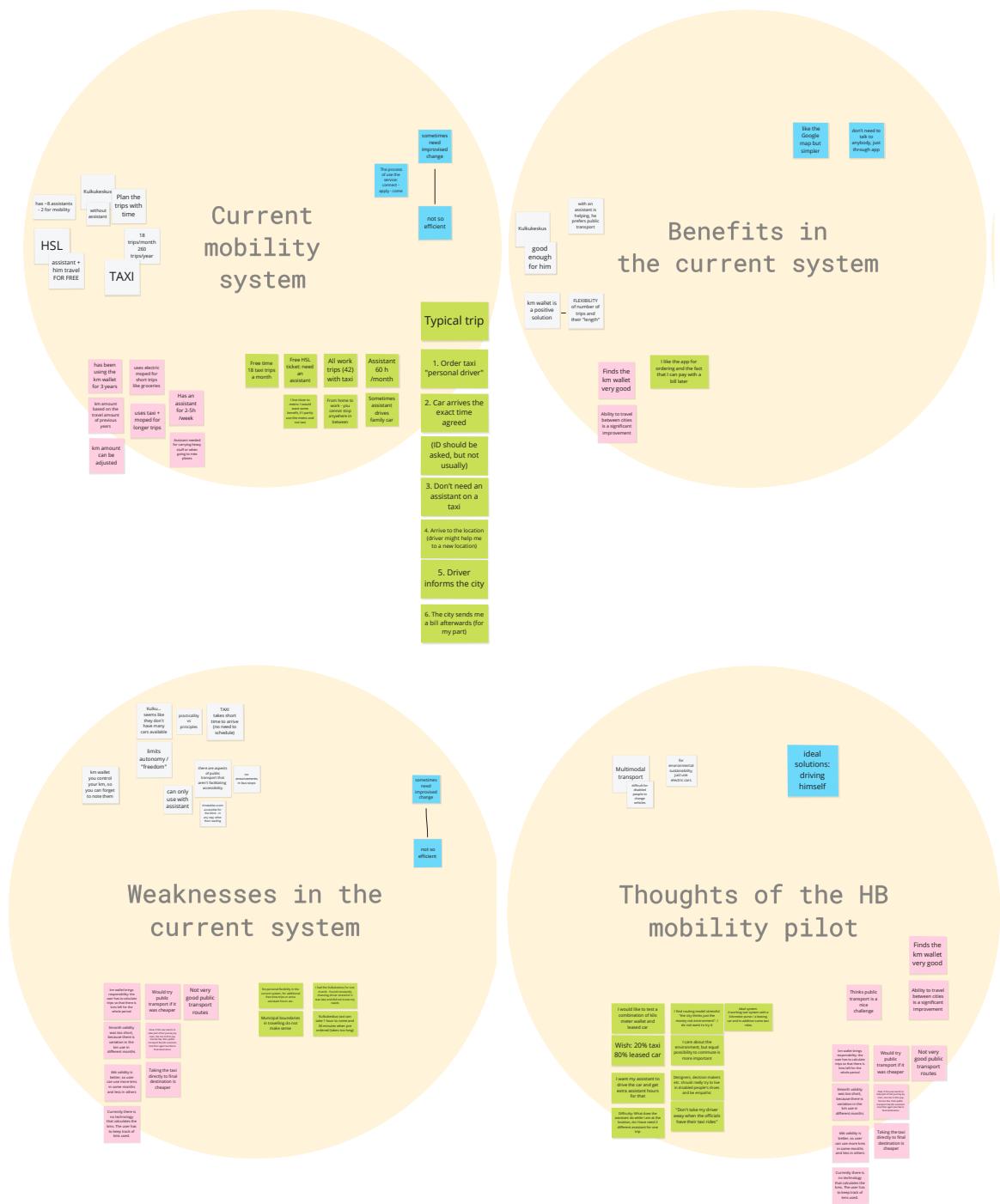


Figure 5. Clusters from first round of Affinity Diagramming

# Research Findings

## Identified pain points

From the first round of affinity diagramming we derived three problem areas:

- How to personalize mobility support services?
- How could we encourage the users to choose public transport?
- How to meet the economic and environmental needs without losing quality of services?

After we had formulated the How Might We-questions for all identified pain points in the second round, we simply took a vote. Each group member voted for the most interesting and relevant pain point they would like to work with. The vote favored four themes:

1. Lack of communication
2. User needs prioritized over funding and environmental sustainability
3. Making public transport more desirable for the users
4. Increasing flexibility and freedom of choice

Doing the affinity diagram two times resulted in relatively similar outcomes, but our group was a lot more confident with choosing to work with these topics after round 2. Also we felt that we had a better understanding of where these themes came from and a better foundation to move on towards the design process.

## Reframing the brief

After we had identified the problem areas we wanted to work with, it was a lot easier to formulate our design drivers and decide on a suitable leverage point and style of intervention. We also reframed the design brief to better suit what our group had found to be most relevant. Since we wanted to keep the user needs at the center of our design process, but municipality needs posed constraints to our work, we formulated a research question that was in the intersection of these two: How to make public transport a relevant option for people with disabilities?

In practise we ended up reframing the design brief several times at various points of our journey. For the midterm presentation we introduced the problem areas we had decided upon after the HMW-method. However, we still had several directions where we could go and we found it difficult to make a clear cut and focus only on one of the problems.

## **Mobility support services process**

Our brief emphasizes the services for people with disabilities that need to commute to work or studies, because that is for whom the pilot of the km wallet is focusing on. However, there are also many other purposes behind journeys, and length is also a differentiating factor. Currently, the ways these journeys take place are through taxi rides and public transport, and in the future implementation of the km wallet, the goal is to promote multimodal transportation, which would combine taxi rides and public transport in the necessary cases. Doing research on accessibility issues in public transport rides, we found an article by Chowdhury, S. [2018] which studied in detail the barriers in typical journeys by public transport users with disabilities in New Zealand. In this article, Chowdhury studies journeys following a previously developed structure, by Zhang [2011], that identifies the stages of a journey as taking place in the built environment and public transport. That way, the barriers within the journey can be differentiated in a clearer way.

From our interviews with the users and Chowdhury's article, we have constructed the following user journeys for public transport, taxi, and the combination of both using the km wallet.

It was clear that all the journeys have the same base, which is when the users must plan and inform on the transports, order the rides and, if possible, check the accessibility of places. In the beginning, they must ensure the whole trip is accessible because they can't adapt quickly to obstacles they might encounter.

### **Taxi journey**

The user of the services has either a taxi card or 18 leisure trips/month to spend on transport. Nowadays, in Espoo, as we have previously mentioned, accessible taxis must be ordered through Kulkukeskus. This service requires ordering with anticipation, because the rides take anywhere from 15min to 1h to arrive.

Users feel that this is limiting their freedom, because it doesn't allow spontaneous rides. Moreover, users complained that with this new service, the taxis can't have a stop in the middle of their journey (e.g. to wait while they buy groceries) and they have to arrange a new ride that might require them to wait another 30min. However, the people with disabilities we interviewed seemed to still prefer using Kulkukeskus (taxis in general) to using public transport.

*The user journey with user comments from interviews can be found in the appendix.*

## **Public transport journey**

Currently, the journey with public transport is the most unpleasant to carry out for users with disabilities. Users feel uneasy because there are many possibilities of having their journeys interrupted by unpredictable barriers, and currently, the barriers aren't found only in the built environment [for example on streets]; sometimes public transport stops/stations aren't accessible for people with disabilities even when they claim they are. Furthermore, for some users, it is more expensive to use public transport, considering that it is also more of an effort.

*The user journey with user comments from interviews can be found in the appendix.*

## **Multimodal journey: combining taxi and public transport – km wallet**

According to our interviewees, the km wallet is a good improvement and there weren't many negative comments for it, on the contrary, users were optimistic. With the implementation of the km wallet, users have a limited amount of km to use each month that is established in proportion to their needs. They must report the km they spent and be aware of the amount they have left for travelling.

However, for the multimodal travelling mode, there were critiques regarding the users' uneasiness of using public transport [previously mentioned], and comments about the pricing, because in some regions without HSL, it would be more expensive. For this reason, it is understood that carrying out multimodal journeys would be promoted together with the use of the km wallet, because currently, in certain cases it isn't cost-efficient.

*The user journey with user comments from interviews can be found in the appendix.*

# Ideation Process

## Design drivers

Design drivers were easy to formulate after we had identified the problem areas we wanted to work with. It was clear that we wanted to keep the user needs at the center of our design process. From analysing the interviews, we also found that there is a lack of communication between users and service providers. For example, some users were worried that their taxi rides would be taken away, would they agree to use public transport more often. Also public transport was not emphasized as an option in the process of applying for the mobility services, nor is there enough information available about the accessibility of public transport. Finally, we wanted to include environmental sustainability in our design process, because our group felt that it is a value that needs to be considered, no matter how hard it is to implement or even if it doesn't feel relevant for the project.

We ended up having three design drivers:

- Embracing the diversity of users' needs
- Clear and open communication to build trust
- Channel environmental sustainability

## Leverage points

While defining what our design drivers were, using the systems map, we identified the leverage points we wanted to target within the system, to accomplish a shift in its behaviour. Considering the factors of sustainability, communication and embracing the diversity of users' needs [from the drivers], we decided to focus on the communication between the users, public services and the public transport companies. That is in view of the perception that currently, based on our conversations with both users and workers in disability services, we found there were misunderstandings, and there was room for improvement in communicating users' needs.

From Meadows' [1997] leverage points model, we want to focus on shifting information flow structures, as we said, improving the two-way communication between users and municipalities, with public transports.

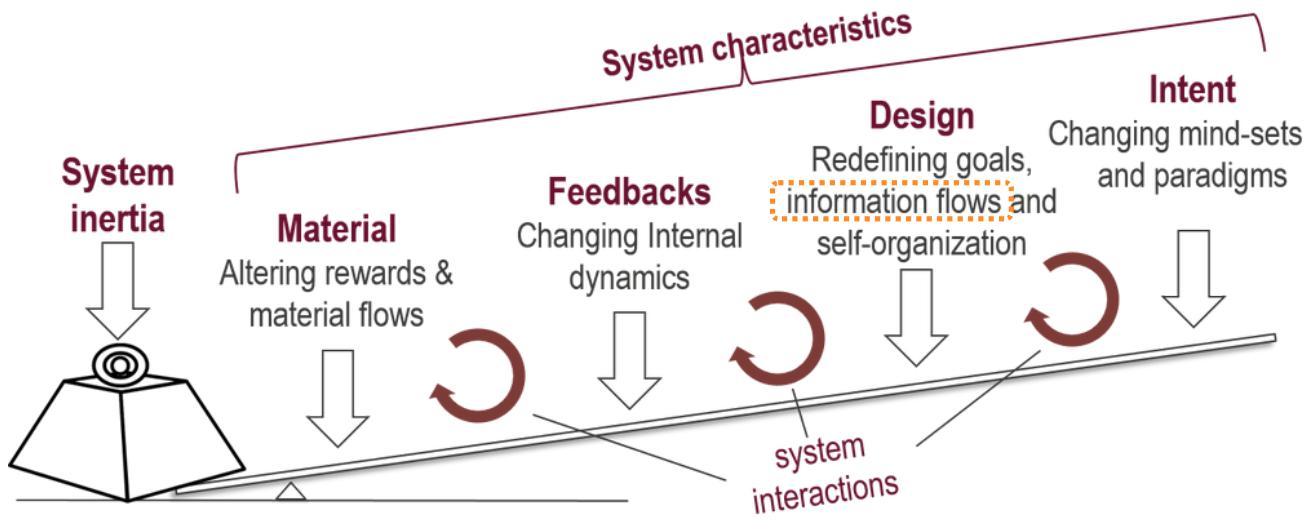


Figure 6. Abson, D. The leverage point framework.

In terms of impact, tackling information flows does not translate into a radical shift in the system as transcending paradigms would, however, it could potentially bring improvements and future changes.

To simplify the system map for a better understanding of the leverage points, we reorganized it, as can be seen next.

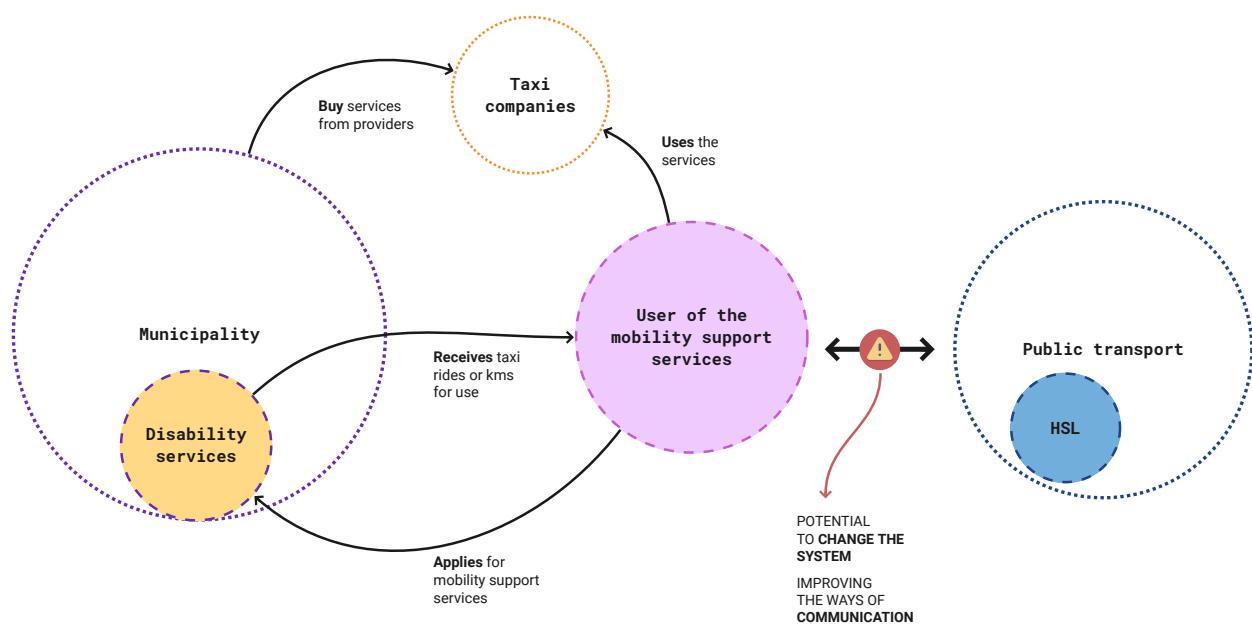


Figure 7. Final version of system's map and leverage point

## **Types of Intervention**

From Andrea Cooper's lecture, we gathered examples of types of intervention that our proposal could consist of. It was clear that our intervention would not be in the early stage, because we wanted to propose a feasible solution that could be soon implemented following the pilot, so the government interventions that act in mature markets and policy ecosystems were the ones that resonated the most. Specifically, the following were chosen to guide/inspire our final proposal:

- Collaborating: providing platforms for citizens to protect vested rights and interests.
- Choice architect: nudging behaviour so the default is attractive and easy.
- Connecting networks: fostering a nexus where government, experts and citizens can co-create change.
- Consumer and supply-chain protection: Protection of consumer rights and upholding standards.

Our project has been guided by a will to understand the mobility support services from the users' perspective. For this reason, the optimal intervention is one that allows them to express their concerns and to be heard [could be through a 'Collaborating' intervention, as well as through 'Connecting networks'], and to ease their current issues in using the less polluting choice - public transport [perhaps through 'Nudging' or 'Consumer and supply-chain protection'].

## **Ideation workshop (with the class)**

We had a shared ideation workshop in class with other DfG groups. In this workshop we presented our chosen styles of intervention and had a brainstorming session to generate a big amount of design ideas. In this workshop, we showed a process map of the communication path a user goes through, beginning when they apply for the mobility support services for the first time and continuing while they use the services. This map shows that there is very little to no information about public transport and its relevance to the user. We also showed a simplified journey map of a typical journey a user takes with the mobility support taxi services, and how public transport would be implemented on the journey. This map shows that the system doesn't encourage the user to choose public transport, and very often it is not a viable option for them.

This session proved to be very helpful, since we indeed got new ideas that we started to develop further. The ideas that we highlighted from the brainstorming session:

- Advisory boards of PwD who participate in development of public transportation. connect to the feedback channel
  - Communication via HSL etc. app/website
  - put in the hsl app whether the bus/train is accessible, could be seen at the same time that you check the timetable
  - Info website for people with disabilities
  - a platform where PwD can make suggestions or highlight problematic encounters [eg. bus #234 has a broken ramp]

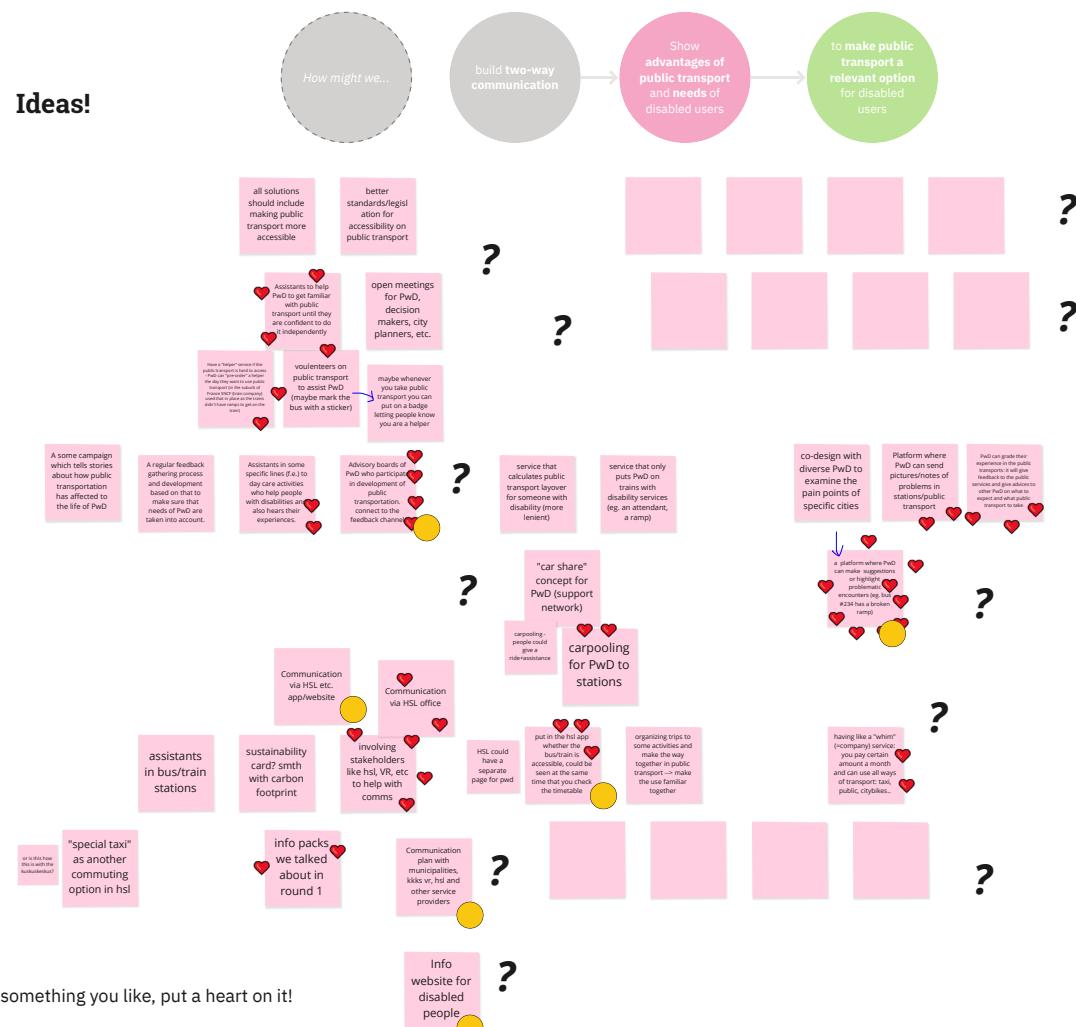
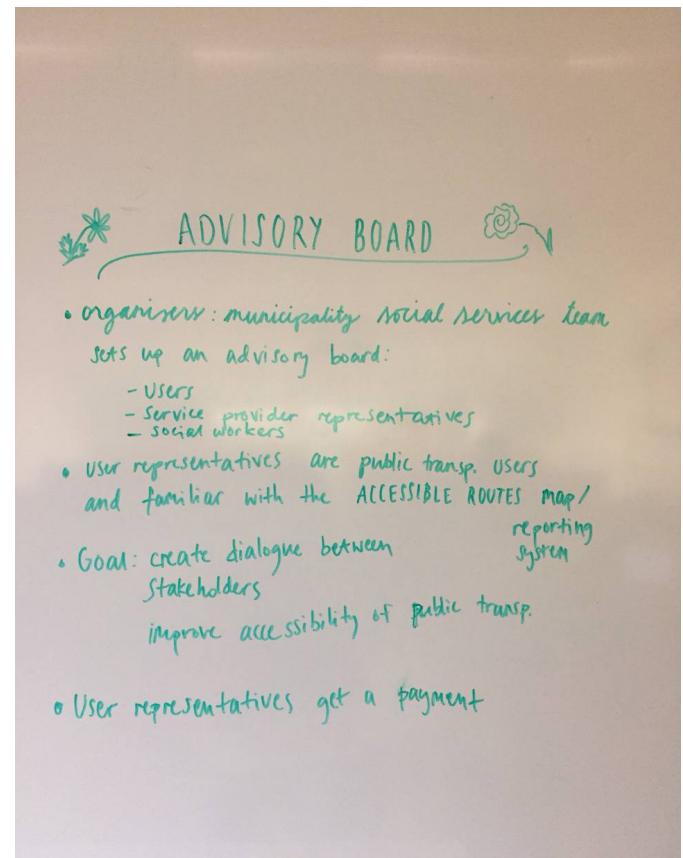


Figure 8. Notes from ideation workshop with the class.

## Brainstorming

We had a brainstorming session after the ideation workshop. In this session, we used many methods to develop our ideas further. We wanted to narrow our scope. For this we used the "Me-we-us" -method. In this method we had the initial ideas from the ideation session. For each idea we developed some additional questions such as "who would provide the service" or "what would be the service journey for the service. We took time and each of us had 10 minutes to ideate solutions for the defined questions. When the time had passed we shared our ideas to other group members. In the end we combined our ideas to a rough concept later presented in the ideation workshop.



Pictures 1 & 2. Me, We, Us method [Otakaari 1].

## Defining the concepts

After the brainstorming session in Otaniemi it was time to define the concepts we had. All in all we had six ideas that we narrowed down to four. Our group member Diana drew inspiring sketches to each of the four concepts to inspire our definition work. These four ideas were:

- Accessibility alerts
- Accessibility filter
- Mobility services guide
- Support services Advisory Board

After drawing the sketches it was time to define preliminary concepts that could be validated in the validation workshop with the user later the same week. We divided the four concepts and each of us had some time to make a short proposal on how that service could work in practise. Later in the afternoon we presented our ideas to other group members and together we made them into a format that could be presented to the others in the validation workshop.

From defining the concepts we learned that when defining several comparable services you first have to have a template for the content that you need to fill. We did not do it in the beginning and due to this we had to make an extra effort to reform all the four concepts into a similar format.

*Summaries of all four concepts are found in the appendix.*

## Validation workshop

Validation workshop was held remotely in Microsoft Teams due to the Covid1-9 situation in Finland. We had invited four people with disabilities and two people from Espoo social services to our validation workshop. For the workshop we prepared a presentation showing our chosen rebrief “How to make public transport a relevant option for people with disabilities?” We had presentation slides for each of our four concepts and discussion slides for an open conversation in the workshop.

In the morning of our workshop we unfortunately got several cancellations: In the end we had two people from the Espoo social services and one person with a physical impairment in our validation workshop. But such is life – we chose to keep the workshop and make the most of it.

The first part of the workshop was about presenting the ideas and having an open discussion on them. First the people were a bit hesitant to comment on the concepts but the pre-planned questions helped them and eventually we even had to cut some fruitful conversations.

Here I have listed some comments we had from our concepts:

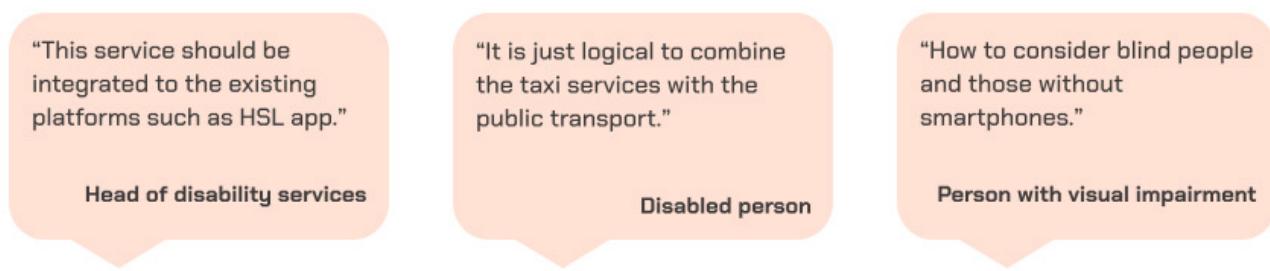


Figure 9. Comments on Accessibility Alerts.

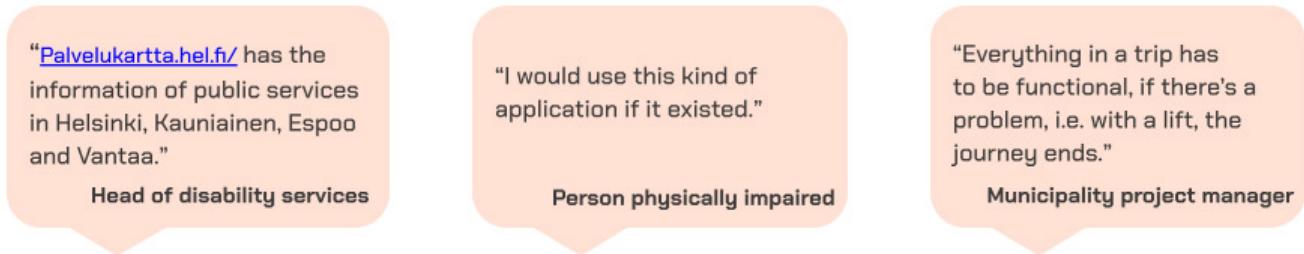


Figure 10. Comments on Accessibility Filters.

The later part was to compare the four concepts we had presented earlier. Since it is sometimes difficult to give feedback we decided to make it as visual and fun as possible. We developed a "validation gameboard" with the concept pictures and short descriptions. Each participant had the opportunity to give 1-5 stars to the concepts based on how feasible or valuable they found them. It was interesting to see how the participants really had to think whether they would give four or three stars to a specific concept based on what they had given to the others. In here we succeeded to make true variation of the validation.

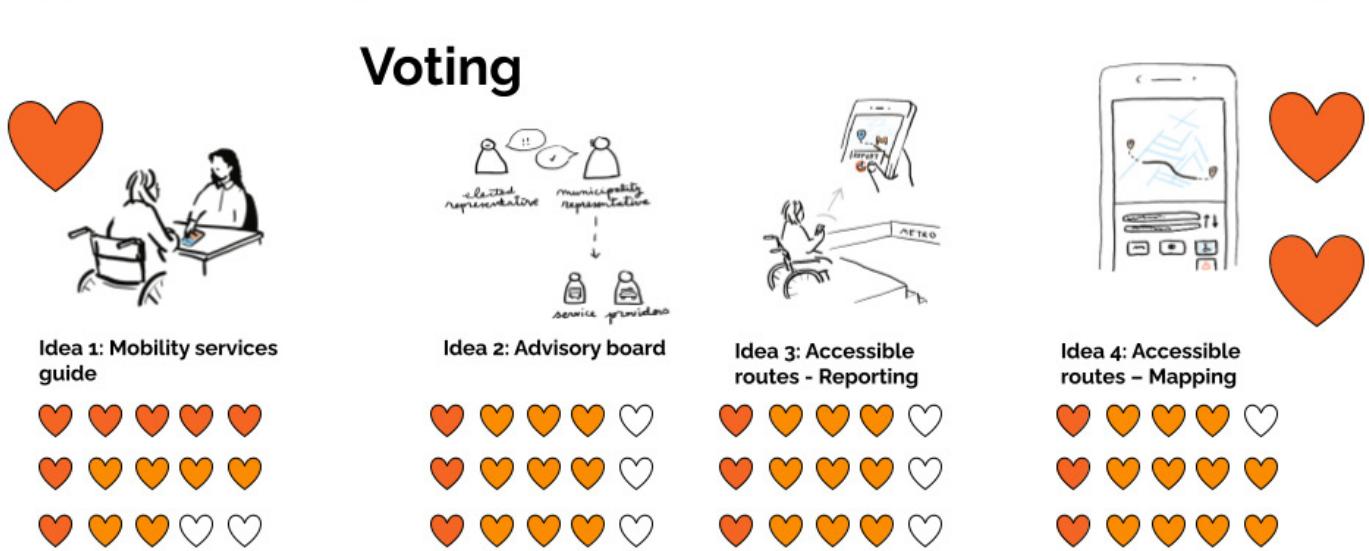


Figure 11. Concept validation board.

At the end of the validation session each of the participants could give one big “golden star” to the concept they found most valid for making public transport a relevant option for disabled people. From the workshop it was clear that we should focus on the combination of the Accessibility alerts and developing the HSL accessibility filters.

Later we emailed other users that participated in the initial interviews to see if they could comment on our proposals. We got two responses with comments relating to each proposal. These comments supported our validation workshop findings.

In workshop circumstances anything can happen. In our case we had less participants than we had expected. But the most important thing we learned is that you have to make the most out of the resources that you have and that is just what we did. Eventually we got deeper understanding from each of our participants’ feelings, when they had more time to reflect on them.

## **Narrowing down (choosing the final concept)**

From the info package, we understood that the city of Espoo was already working on improving their communication and developing brochures with information to clarify it. So, it seemed like these aspects were already being targeted by the municipalities.

For the accessibility alerts, there were comments about how “accessibility isn’t one thing, it’s a route”, “Everything in between has to be functional, if there’s a problem with a lift - the journey ends.” A municipality worker showed us Palvelukartta, where the public transport stops and stations, and both public and private services within Espoo, Vantaa, Helsinki and Kauniainen, are featured. There were too, in certain cases, notifications of their accessibility.

Here is also one insight, which we got from the participants in the workshop through email: Different disabilities require different types of platforms. This means that the alerts and the filters should not be developed only for smartphones. In an ideal world they should be also accessible through desktop websites that are accessible with screen reader applications.

# Final Proposal

## Problem storytelling

### User persona Sara

When we had narrowed down our concept it was time to come back to the basics - to the user. We wanted to create a user story that would bring life to our service concept. We wanted to create a user persona based on our previous interviews. She was named Sara and she lives with her partner and son in Espoo. She is not working currently. She needs support in everyday activities and has an assistant to help her 3 times a week. Here is her story:

*"Art is her passion. She would like to visit museums and art galleries in Helsinki, but unfortunately her monthly taxi rides are not enough to make it happen."*

*"She has 18 monthly one way trips to use in her free time. She thinks HSL has great services but she is still uneasy when taking public transport."*

Creating a user persona helped us show that people with disabilities are human beings and not just numbers or pain point listings. You feel more empathy to a person than an anonymous user journey.

## User journey: Current process using public transport

Next we came up with a story of her trying to use public transport.

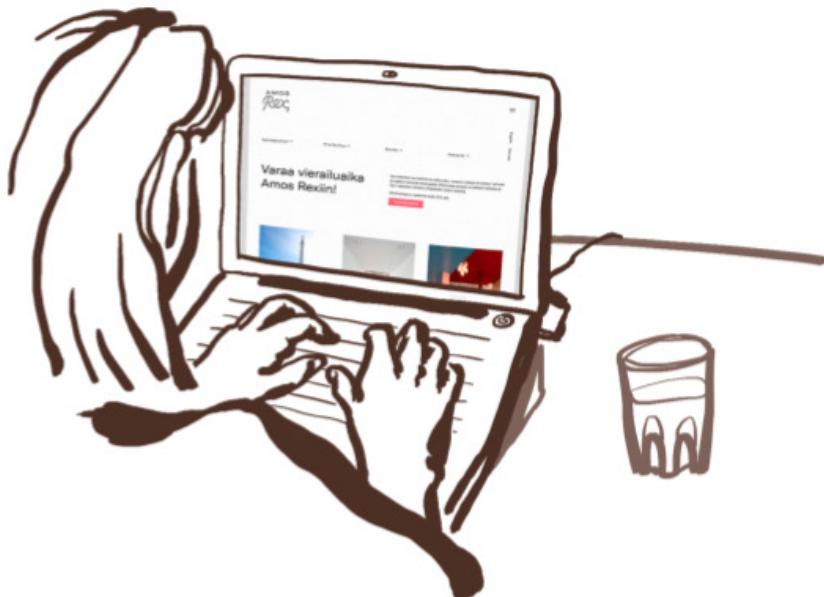
*"Sara wants to visit the Amos Rex museum and searches for availability on the museum's website. There is an accessible entrance situated on the Lasipalatsi Square side."*

*"Sara checks the route with public transport on the journey planner in the HSL website. HSL suggests walking 12 minutes, taking the 146A bus, and walking 8min to arrive at the destination."*

*"The bus she has been recommended to take is 1,3km away, [it's going to take some effort, but she can make it] She doesn't remember architectural barriers on the way, so she decides to go."*

*"It seems like they've just started construction work near the bus stop and the floor isn't "safe" for her. Near the bus stop there is construction work going on, and she can't access it as she should. "I should have just taken a taxi, she thinks."*

Sara wants to visit the Amos Rex museum and searches for availability in the museum's website.



There is an accessible entrance situated on the Lasipalatsi Square side.

Picture 3. Illustration from the user journey.

In Sara's journey we wanted to highlight how difficult it is for a person with disabilities to use public transport although they would be motivated to use it. The main points in the process was to show how the HSL app shows long walking distances for people who are not able to walk more than a few steps. Another point was to show that currently there is no reporting system to show where some accessibility issues and people with disabilities might expect some place to be accessible when it in fact is not.

Eventually we think we did a good job in creating the user persona. The pictures Diana drew to the concept really made it stand out. Maybe a learning opportunity is that we could have identified the user persona earlier in the project - that could have helped us to define our target audience.

## Concept 1 – Accessible routes -filter

### Benchmark the current HSL accessibility filter

As we had learned from our interviews and validation workshop, people do not want new information channels. Instead they want the new information to be integrated into existing services, which they already are using. This is why we decided to integrate accessibility filters into HSL Reittiopas (route finder) application/web page.

To develop our service design concept we had to test the existing HSL Reittiopas accessibility filter. First thing we noticed was that the only disability filter was a wheelchair, when there are in fact many other disabilities out there. Another thing that we noticed was that there was not any filter on if a person has an assistant with them or not.

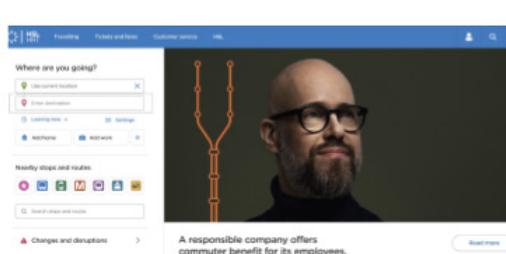
The most tragicomic part was when we realized that the routes that Reittiopas gives with the disability filter seem to be exactly the same that it gives without the filter. That is strange as we all know in a rush hour for example a bus is not accessible for all users and the driver might not have time to help.

Another thing that surprised us was that the current HSL accessibility filter might offer many kilometers of walking to a person with a wheelchair. Most wheelchair users are not able to succeed on that. This is why we would need the opportunity for that person to take a taxi to the accessible station or stop if needed.

## Concept 1 – HSL Accessibility filter

**Why?**  
HSL has accessible filter that should show accessible routes. In action it shows routes than for expecting disabled users to walk to the stop.

**Target:**  
Finding accessible journeys with public transport for different types of disabilities.  
  
If needed showing the most convenient journey with taxi/car to nearest accessible public transport station



A screenshot of the HSL Reittiopas website. The top navigation bar includes 'Home', 'Traveling', 'Fares and fares', 'Customer services', 'HSL', and a search bar. Below the navigation is a search field with 'Where are you going?' and dropdowns for 'Departure location' (set to 'Uusimaa') and 'Arrival destination'. Underneath are buttons for 'walking' and 'accessible'. A sidebar on the left lists 'Nearest stops and routes' with icons for walking, accessible, and car. At the bottom, there's a section for 'Changes and disruptions' and a footer with social media links. To the right of the map is a portrait of a man with glasses and a beard, with the caption 'A responsible company offers commuter benefit for its employees.'

**How?**  
Developing HSL accessible filter  
➤ Different disabilities  
➤ Showing the taxi/car ride to public transport  
➤ Being honest with the accessibility of the vehicle

**Users and providers**  
Users would be disabled people with their assistants and close ones  
  
Service would be developed and provided with HSL in collaboration with Uusimaa municipalities

Creative Commons CC BY 4.0 2018 Eva Nieminen, Esko-Matti Hehn, Diana Băcărescu Mat, Fengyu Li, and Design for Government course at Aalto University

Figure 13. Concept 1 – HSL Accessibility Filter.

## **Service concept development**

For the service concept we wanted to use the “What, why, when, where, who and how” model. We had the basic idea of the concept in our head but now it was important to define what it will mean in practice. Next we will present our defined concept.

### **Why?**

HSL has an accessible filter that should show accessible routes. In reality it is expecting users with disabilities to walk to the stop. We need proper accessibility filters to match the different needs of the various users.

### **What?**

We want people with different types of disabilities to be able to find accessible journeys with public transport using the HSL app. If needed the HSL app should suggest the most convenient journey with a taxi/car to the nearest accessible public transport station.

### **How?**

We want to develop the HSL Reittiopas accessible filter to take into account different disabilities. We also want the app to show the taxi/car ride to public transport and not so unrealistic walking routes. We also want to have a filter for assistant availability - vehicles are differently accessible depending if you have an assistant or not. We also want the HSL accessibility filter to be honest about the accessibility of public transport.

### **When?**

The service would be used before the journey to check the accessibility of the route.

### **Where ?**

The HSL accessibility filters would be integrated to HSL Reittiopas. People could use the filter in the Helsinki capital area. Later the same features could be implemented in the route finders in other parts of Finland.

### **Who?**

People with disabilities would use HSL accessibility filters with their assistants and families and other close ones. It would be developed and provided with HSL in collaboration with Uusimaa municipalities. If needed, some people could be test users to test accessibility of public transport.

# Customer journey – HSL Accessibility filter

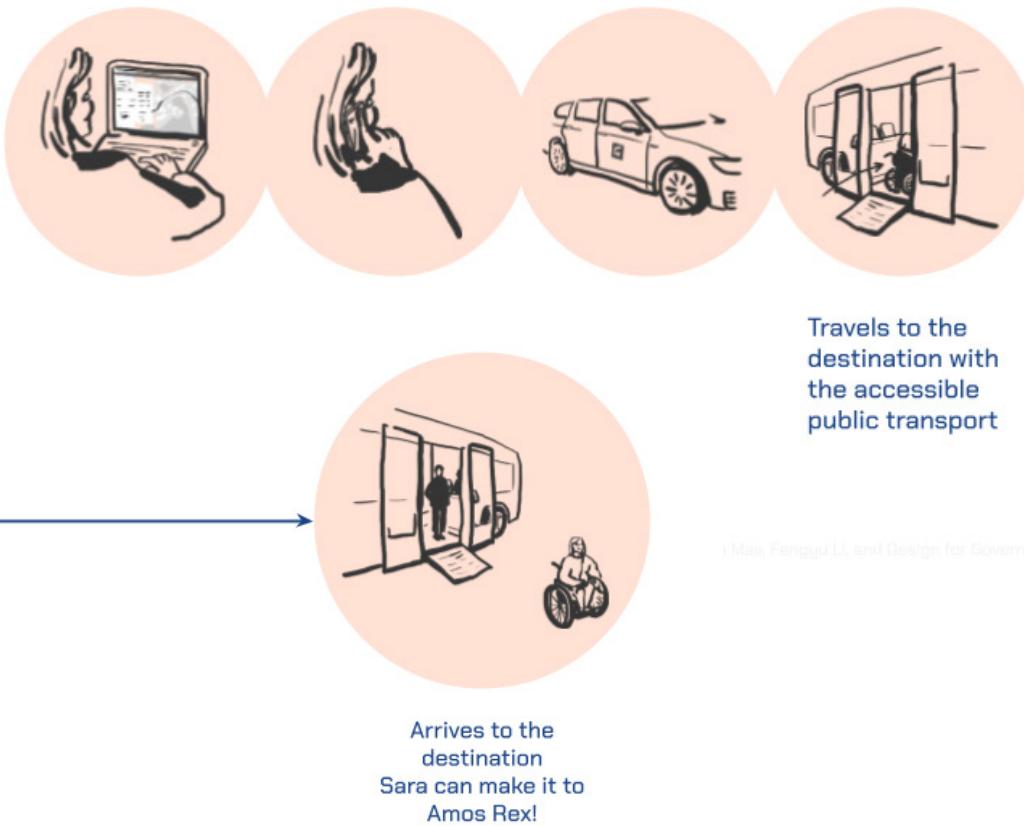


Figure 14. Concept 1 – Customer journey illustrated.

## Customer journey

After defining the basic elements of the HSL accessibility filter we needed to define how the customer journey would look like. In the customer journey it was clear that we wanted to be as visual as possible. We had a small ideation session, where we wrote down on a paper the different steps of a person using our service. We could have done it digitally in the first place but we found writing by hand to be a more creative way to do it. We wanted the user journey to be empathic but generic enough. That's why in this journey we did not highlight Sara.

After sketching the customer journey we moved it into digital format. After that we made a sketch for each of the journey fase. We think the pictures bring the concept to live and make it relatable.

## **Prototype**

After we settled down on the main solution of the future improved service, we decided to draw some sketches and make prototypes of our solutions, so we held a small content workshop.

First thing was to sketch the accessibility filter and we started by discussing what detailed function would be inside the filter. Every team member needed to think, what function would be needed from the perspective of disabled people. Finally, we decided the functions of the accessible filter would include:

1. It will be attached after the "setting" function of the main map.
2. It will include 3 filters, which are physical impairment, visual impairment and hearing impairment.
3. There will also be one additional option: get an assistant or not.

Because of the option of choosing to get an assistant or not, the content in the route recommendation part would also be changed in Reittiopas. Considering when a user gets no assistant, the system will recommend user routes which includes only accessible public transport and not too much walking. The walking would be replaced with a taxi ride to the nearest accessible public transport. If Reittiopas would recommend taking a taxi to a bus stop it would have an "order taxi service" button below the routes recommended. With this information the user can order the taxi with Kulkukeskus or call a service number.

*Screencaptures from the prototype attached in the appendix.*

## **Concept 2 – Accessibility alerts**

### **Deciding the platform**

When we were designing the HSL accessibility filters and accessibility alerts we had to make a decision on what platform these services would be later developed. It was a wish from both the people with disabilities and municipality stakeholders that participated in the project, that they do not want to have any new service providers or information web pages. In the accessibility filters the solution was clear - we would develop the existing HSL Reittiopas web page and application to fit to the users needs.

For the accessibility alerts our first idea was to implement it to the HSL Reittiopas. An issue in this was that HSL is a very independent organization. It is owned by the municipalities but the municipalities are not communicating too much with HSL. HSL Reittiopas already has a lot of features such as showing the routes, showing the amount of city bikes etc. We were wondering, would the accessibility alerts be easily available on the HSL map.

Another option was to develop a separate webpage showing the accessibility alerts in public places. This would have been against our user's wishes. From our validation workshop we found Palvelukartta, which is a service map showing different services in the capital area. Palvelukartta is a public service showing for example the accessibility of different public spaces such as stops and stations of public transport. We agreed it was best to include the service into this platform that already has information on the accessibility.

### **Service concept development**

We used the “What, why, when, where, who and how” model also for this concept of accessibility alerts. In our group we had different ideas of how the service would work and who would provide it. The model helped us to define the service concept.

## Why?

People with disabilities need the information whether the public transport and the stations and stops are accessible or not before they use them. If it for example comes as a surprise that the elevator in the Metro station is broken, the person with disabilities has come there in vain. In Palvelukartta you can see the accessibility of that current stop or station but you can not give accessibility alerts if there is an issue.

## What?

We want to create an accessibility alerts feature to Palvelukartta where the person can report the accessibility issues and people with disabilities can see the alert.

## How?

Make a reporting feature where the user can report the accessibility issues that they find in the area - they will be reviewed to avoid spam.

## Who?

Everyone could report the issues and people with disabilities would especially benefit from the service. Palvelukartta will collaborate with various stakeholders to overcome the accessibility issues. The alerts would be reviewed by the municipality personnel.

## Concept 2 – Palvelukartta accessible alerts

### Why?

Palvelukartta is a service map that shows public services units with sometimes their accessibility information.

Currently you cannot report accessibility issues to palvelukartta

### Target:

Have a system to report the accessibility issues in public transport and other public places into palvelukartta.



### How?

Make a reporting feature where the user can report the accessibility issues that they find in the area - they will be reviewed to avoid spam.

### Users and providers

Everyone could report the issues and disabled people would especially benefit from the service.

Palvelukartta will collaborate with various stakeholders to come over the accessibility issues.

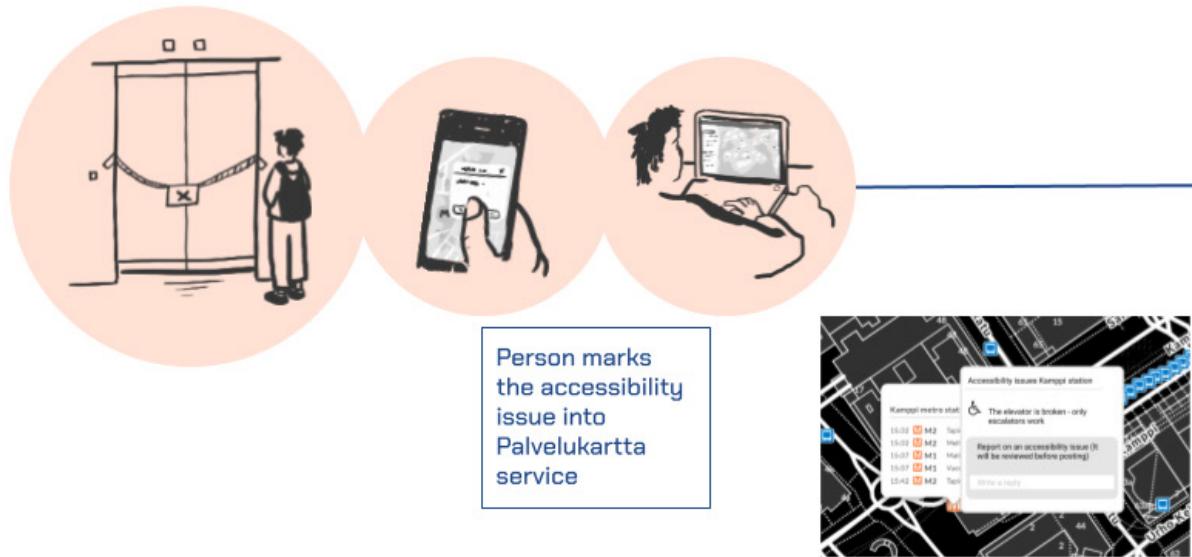
Creative Commons CC BY 4.0 2018 Eva Nieminen, Esko-Matti Heini, Diana Bacareci Mac, Fengju Li, and Design for Government course at Aalto University

Figure 14. Concept 2 – Palvelukartta Accessibility Alerts.

## Customer journey

The process to create the customer journey was similar to the HSL filter. We started defining the process together by writing down the story by hand. In this process it was important to highlight the fact that it won't be only the people with disabilities who would be reporting the accessibility issues. Anybody has the possibility and almost a duty to do that. We also wanted to show how the accessibility issue can be marked "solved" and be removed from the map. Eventually we drew the pictures for all the steps in the process.

## Customer journey – Accessibility alerts



Creative Commons CC BY 4.0 2018 Eva Nieminen, Esko-Matti Heikkilä, Diana Băcărescu Moa, Fengyu Li, and Design for Government course at Aalto University



Creative Commons CC BY 4.0 2018 Eva Nieminen, Esko-Matti Heikkilä, Diana Băcărescu Moa, Fengyu Li, and Design for Government course at Aalto University

Figure 16. Concept 2 – Customer journey illustrated.

## **Prototype**

We started sketching the feedback part after deciding the detailed function of the accessible filter . About this part we held a content workshop that followed the same pattern.

Every team member tried to find some references or design their own ideas, and then we gathered our ideas to find common and feasible points. Finally, for this part we decided to refer to the review function of Google map.

The steps of this function will include:

1. User clicks the location on the map.
2. The reviews about accessibility issues will show after the description of one location, the user can read the reviews.
3. The user can also add his own reviews, by inputting insights in the input box and sending it to Palvelukartta.

After the administrator reviews in the background, the reviews added by the user will also be displayed on the web page. This will help the disabled people to avoid inaccessible public transport stations and stops.

*Screencaptures from the prototype attached in the appendix.*

# Conclusion

Municipalities are lawfully required to provide equitable possibilities of transportation to people with disabilities, hence the taxi transport services have been designed. The reformation of the disability service act, and the redesign of the mobility support services along with it has provided us a chance to evaluate the most important principles of designing services to people in the 2020s.

Throughout our research we have made the observation that the design process and decision making should include the views and opinions of users more than has been the custom. In the beginning of our research we could guess that not including the service users in the design process would lead to services not matching the user needs. However, we also found out that lacking cooperation between stakeholders can lead to communication errors and create mistrust and wariness towards the service provider. We found that this was the case with the concept of multimodal transport. Some users were afraid that using public transport would decrease the amount of taxi drives they could take – that taking a bus once would be a slippery slope to diminishing taxi services.

As our group started to look into this dilemma of users being reluctant to take public transport, we found out that public transport is widely inaccessible for people with disabilities. This revelation lead us towards our final proposals. In order to encourage people with disabilities to use public transport, it has to be accessible for them to use.

Our two design concepts: the accessibility filter to HSL reittiopas and the accessibility alerts on Palvelukartta are tools of communicating more effectively about the accessibility and the barriers that exist when taking a journey by public transport. We chose to use existing platforms that are already widely used and are possible to update, because we wanted to amplify good work that has already been done. We chose to focus on communication, since we believe it will have an effect on users who want to try out public transport, as well as the service providers, who want to improve the transport network to be more accessible. Finally, we chose to look into the multimodal transport model out of all mobility services, since we wanted to strengthen the users' possibility to choose an ecological option. Our group agreed that it is important to apply environmental sustainability principles in the mobility services, but the rights of the users have to be secured in this process.

# References

## Literature

Meadows, D. H. [1997]. 6. Leverage points: Places to intervene in a system. Thinking in systems: A primer [pp. 145–165]. Chapter.

Park, J., & Chowdhury, S. [2018]. Investigating the barriers in a typical journey by public transport users with disabilities. *Journal of Transport & Health*, 10, 361–368. <https://doi.org/10.1016/j.jth.2018.05.008>

## Websites

Bormans, Y. [2020, July 24]. Clean Vehicles Directive. Mobility and Transport - European Commission. [https://ec.europa.eu/transport/themes/urban/clean-vehicles-directive\\_en](https://ec.europa.eu/transport/themes/urban/clean-vehicles-directive_en).

Espoo. [n.d.]. Kulkukeskus. Länsi-Uudenmaan kulkukeskus. [https://www.espoo.fi/fi-FI/Sosiaali\\_ja\\_terveyspalvelut/LansiUudenmaan\\_yhteiset\\_palvelut/Kulkukeskus](https://www.espoo.fi/fi-FI/Sosiaali_ja_terveyspalvelut/LansiUudenmaan_yhteiset_palvelut/Kulkukeskus).

Heikkilä, R. [2012, April 2]. Kimppakyydit uhkaavat loppua. Yle Uutiset. <https://yle.fi/uutiset/3-5252990>.

THL. [2020]. Kuljetuspalvelu ja saattajapalvelu - Vammaispalvelujen käsikirja. Terveyden ja hyvinvoinnin laitos. <https://thl.fi/fi/web/vammaispalvelujen-kasikirja/tuki-ja-palvelut/liikkuminen/kuljetuspalvelu-ja-saattajapalvelu>.

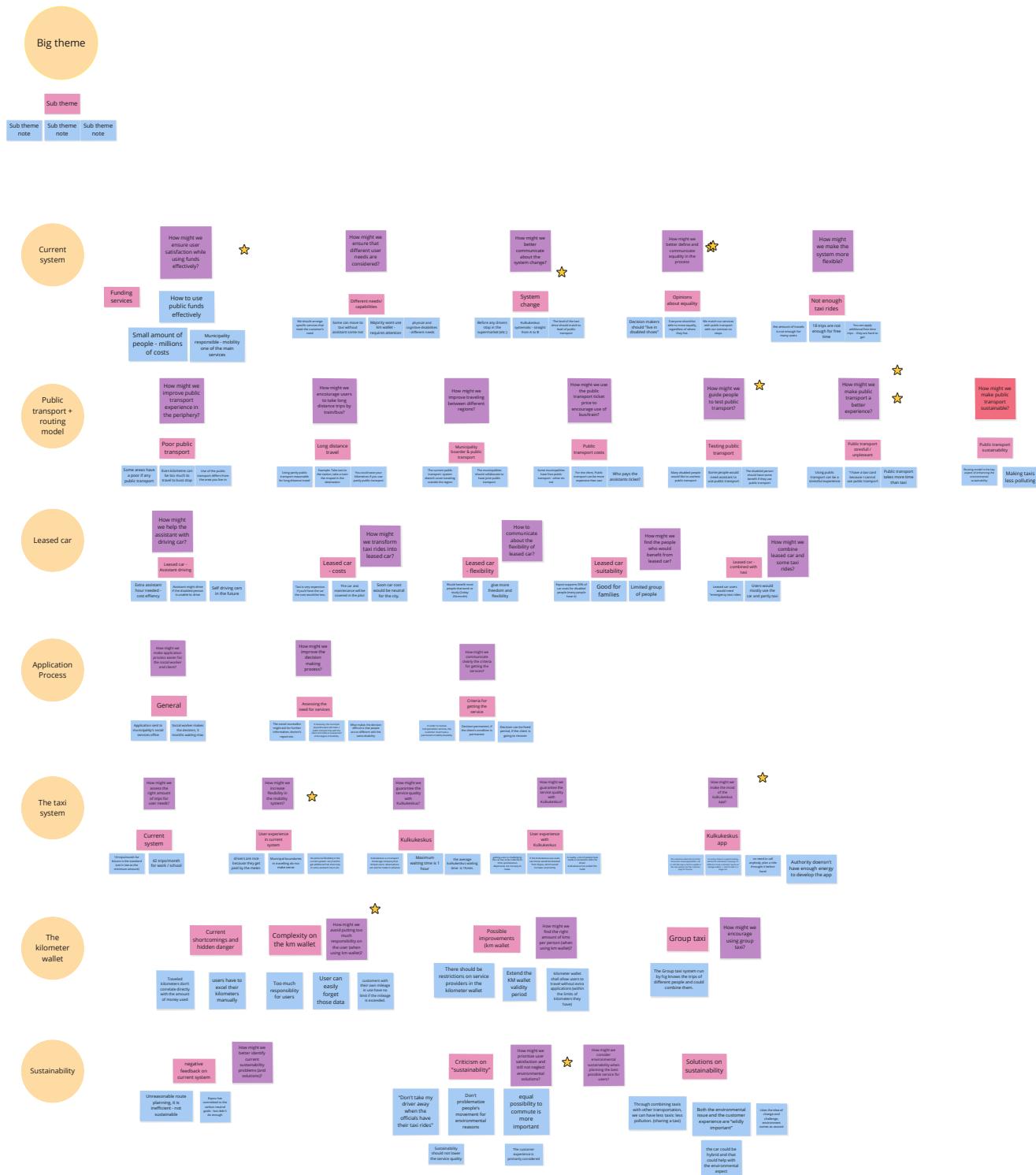
## Images

Adapted graphic by: Abson, Dave. The Leverage Points framework. [Graphic]. Leverage points for sustainability transformation.

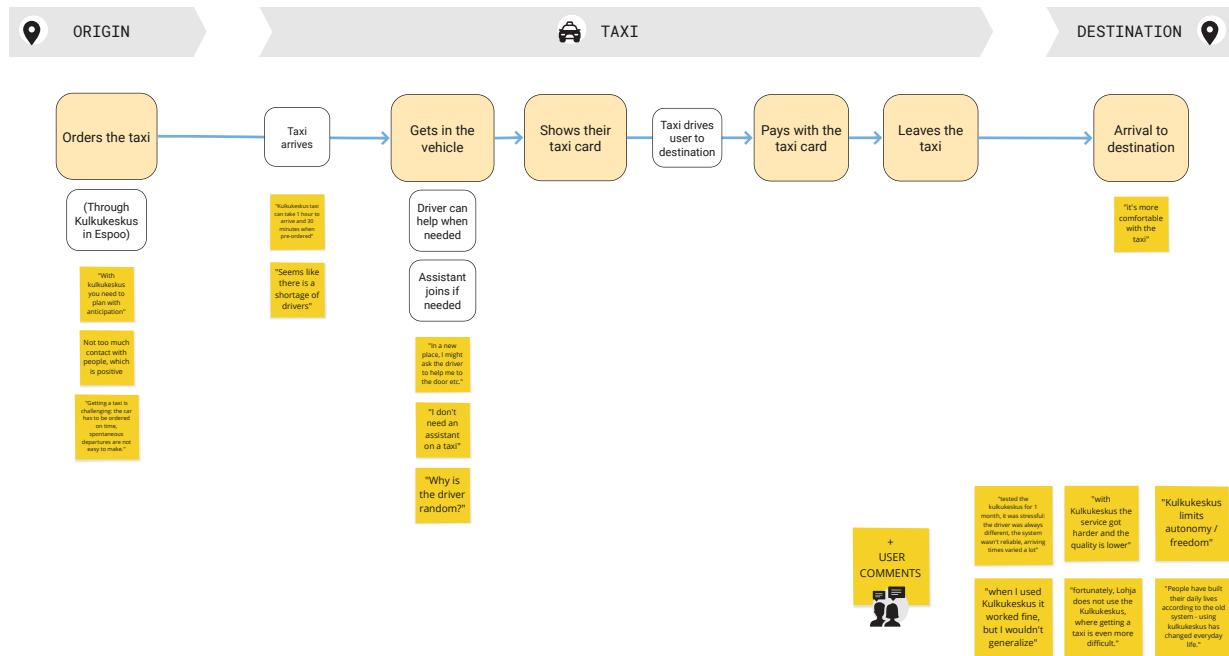
<https://leveragepoints.org/2020/03/24/where-do-we-go-from-here-a-blog-post-on-crisis-and-leverage/>

# Appendices

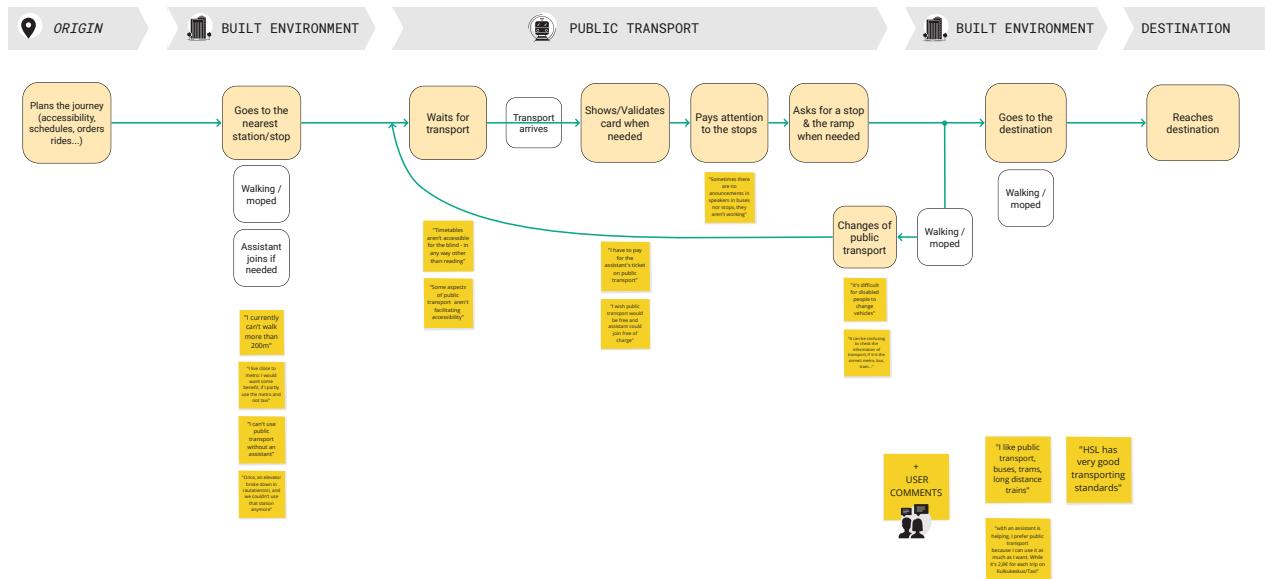
## 1. Affinity Diagram



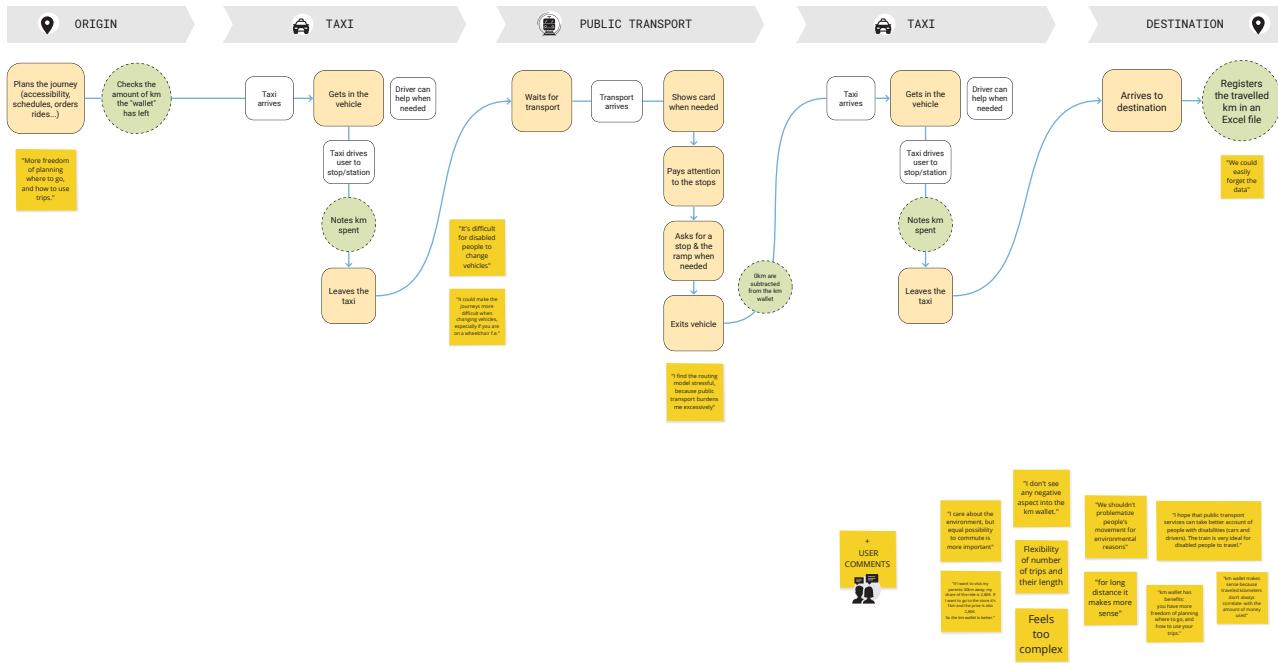
## 2. Taxi journey in current system



## 3. Public transport journey in current system



## 4. Multimodal transport journey in current system



## 4. Concept ideas introduced in the validation workshop

---



### Idea 1: Mobility services guide

1. When I was 35, I got into an accident on a skiing holiday in the Alps. My legs were permanently injured and now I use a wheelchair. I had to adjust to a life where things didn't work the way I was used to.

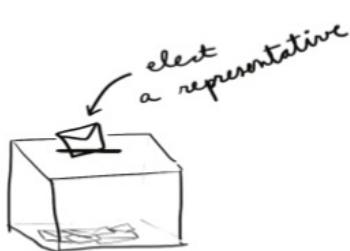
2. I wanted to maintain my active lifestyle, and searched for information about the services I could get. My home town's website had an info package that had all the information regarding mobility services for disabled people. Once I applied for the services, I got the info package also from my social worker.

3. In the info package I could find for example the simplified and clear descriptions of different mobility services and how to use them best

- Maria, 40

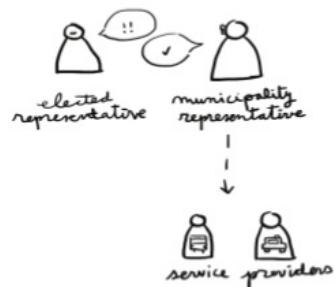
---

### Idea 2: Support services Advisory board



"I have to pay for my assistant everytime, so I don't want to use the public transport near my house"

Antti, 57 blind person



"Antti is elected in the Advisory board. He will communicate concerns to the authorities"

In the Advisory meetings he will join municipality and transport representatives, and share issues.

The Advisory board is a place where Antti can talk about these issues from all the disabled users in the municipality, and get a response.

---

## Idea 3: Accessible routes - Reporting



1. "I noticed that in Kannelmäki Metro Station there is only stairs to the platform.

The elevator is broken"

Helena 44 - on a wheelchair

2. "I report the accessibility issue on a map in HSL web page.

The map is public and everyone can notice the issue"

Helena 44 - on a wheelchair

3. "I see the accessibility issue on the map I order reparation for the elevator "

"When the issue is fixed I mark it fixed"

Harri 35  
Helsinki city repair services

---

---

## Idea 4: Accessible routes – Mapping



1. "I live in Olari (Espoo) and want to travel to Kamppi (Helsinki)

2. "I use HSL Reittiopas accessibility filter and search for routes"

3. "Notification: Take a taxi to Tapiola and use Metro to travel to Kamppi"

"I order the taxi from Kulkukeskus app and start my journey"



Karri 36 - on a Electric moped

## 5. Concept 1 – Accessibility filter prototype

**1.**

Where are you going?  
Use current location  
Enter destination  
Looking now...  
Add home Add work  
Nearby stops and routes  
Search stops and routes  
Changes and disruptions

A responsible company offers commuter benefit for its employees.  
Read more

**2.**

Itinerary suggestions  
Kamppi, Helsinki → Paita, Lappohjankatu 3-9 Espoo  
Departure 14:46  
Earlier departures  
14:51 - 15:28 36 min  
Leaves at 16:08 from station Helsinki  
14:50 - 15:32 41 min  
Leaves at 16:02 from station Helsinki  
15:00 - 15:34 33 min  
Leaves at 16:12 from station Helsinki  
15:15 - 15:49 33 min  
Leaves at 16:22 from station Helsinki

Settings  
Commuter train  
Metro  
Ferry  
City bike  
Avoid transfers  
My modes of transport  
Bike 20 km/h  
Accessibility

**3.**

Itinerary suggestions  
Kamppi, Helsinki → Paita, Lappohjankatu 3-9 Espoo  
Departure 14:46  
Earlier departures  
14:51 - 15:28 36 min  
Leaves at 16:08 from station Helsinki  
14:50 - 15:32 41 min  
Leaves at 16:02 from station Helsinki  
15:00 - 15:34 33 min  
Leaves at 16:12 from station Helsinki  
15:15 - 15:49 33 min  
Leaves at 16:22 from station Helsinki

Accessibility  
Type  
Physical impairment   
Visual impairment   
Hearing impairment   
Got on assistant

**4.**

Itinerary suggestions  
Kamppi, Helsinki → Paita, Lappohjankatu 3-9 Espoo  
Departure 14:46  
Earlier departures  
14:51 - 15:28 36 min  
Leaves at 16:08 from station Helsinki  
15:00 - 15:34 33 min  
Leaves at 16:12 from station Helsinki  
15:15 - 15:49 33 min  
Leaves at 16:22 from station Helsinki

Accessibility  
Type  
Physical impairment   
Visual impairment   
Hearing impairment   
Got on assistant

Too few results? Try a Train  
Open Train app

## 6. Concept 2 – Palvelukartta Accessibility alerts prototype

The screenshots illustrate the Palvelukartta Accessibility alerts prototype, showing a map of Helsinki with accessibility issues highlighted.

**Screenshot 1:** The map shows several locations marked with blue squares. A red circle highlights a specific location, and a red arrow points down to the next screenshot.

**Screenshot 2:** A callout box for "Kamppimetro station B" provides details about accessibility issues. The box lists:

- 15121 MFL Faste
- 15122 MFL Hällomaisi
- 15123 MFL Väistötilat
- 15127 MFL Pääsäät

A red arrow points down to the third screenshot.

**Screenshot 3:** A callout box for "Kamppimetro station B" provides more detailed information. It states: "The elevator is broken - only escalators work". Below this, a text input field says: "Report an accessibility issue (it will be reviewed before publishing)".



