



## **TRansport Innovation for disabled People needs Satisfaction**

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### **D7.1 Industry Roadmap and policy recommendations**

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# Table of Contents

<b>Table of Contents</b> .....	<b>4</b>
<b>Executive Summary</b> .....	<b>5</b>
<b>1. Introduction</b> .....	<b>6</b>
<b>2. Snapshot of urban mobility in Europe</b> .....	<b>7</b>
<b>2.1 On becoming inclusive</b> .....	<b>8</b>
<b>3. Overview of Stakeholders</b> .....	<b>11</b>
<b>3.2 Assistive technology: Unlocking its potential for urban mobility</b> .....	<b>16</b>
<b>3.3 Standardisation: A key driver for levelling the playing field</b> .....	<b>17</b>
<b>4. Co-creating an accessible and inclusive urban mobility</b> .....	<b>18</b>
<b>4.1 Understanding a city’s urban mobility inclusivity gaps</b> .....	<b>18</b>
<b>4.2 Co-design: The right approach to finding the right solution</b> .....	<b>19</b>
<b>5. Roadmap</b> .....	<b>24</b>
<b>5.1 Adopt a participatory innovation approach</b> .....	<b>24</b>
<b>5.2 Commit to a new set of organisational values</b> .....	<b>25</b>
<b>5.3 Set inclusive innovation priorities</b> .....	<b>26</b>
<b>5.5 Adopt user centric KPIs of accessibility</b> .....	<b>28</b>
<b>6. Conclusions</b> .....	<b>29</b>
<b>ANNEX 1: Methodology &amp; Stakeholder Engagement</b> .....	<b>30</b>



## Executive Summary

### No Passenger Left Behind: A Roadmap for co-creating accessible public transport

This report synthesises an industry roadmap for overcoming institutional barriers and encompasses the policy recommendations and their validation with industry representatives.



# 1. Introduction

This WP7 deliverable integrates the outcomes of WP2-WP6 into industry and policy recommendations to facilitate the adoption of inclusive design practices in future mobility systems.

In general, the main goal of WP7 is to synthesize outcomes of all WPs together and feedback from their validation from our dissemination and stakeholder engagement efforts and produce an elaborated roadmap that will cover policy recommendations, for local and transport authorities in order to overcome barriers and adopt new inclusive digital mobility solutions. The roadmap will also include proposals for future research and more general recommendations, which can be applied at EU level. The following outcomes from different WPs were included into this report:

- results of the research on users' divergent needs with respect to mobility and their attitudes towards future mobility solutions (WP2);
- state-of-the-art and tendencies related to mobility services, ICT technologies, accessibility legislation and standards, assistive technologies (WP3);
- design concepts and results of users' evaluations of technologies (WP4);
- principles of co-design methodology (WP5);
- experience of implementation of co-design methodology while developing mobility solutions in the pilot cities and working on business cases reports (WP6).

Hence, this industry roadmap describes the industry and policy recommendations for overcoming institutional challenges to adopting citizen-driven mobility innovations. It also outlines the steps that may lead to further development (research priorities) and adoption of inclusive digital mobility innovations for all categories of public with a special attention to the vulnerable ones.



## 2. Snapshot of urban mobility in Europe

Cities host 75% of the European population and are the centres of economic and social activities. They are key enabling actors to reaching climate neutrality, especially when considering that urban mobility accounts for 40% of CO2 emissions related to road transport<sup>1</sup>.

As suggested on the ARUP and UTG 2022 report, the transport industry is currently experiencing disruption and innovation from a range of new mobility modes, services, and business models. Mobility patterns are influenced by various factors such as growing mobility demand, digitalisation, and new mobility services, including ridesharing, carsharing, carpooling, micro-transit and micro-mobility services. These new drivers disrupt the mobility ecosystem by altering the speed and frequency levels of service provision, as well as the ways customers can plan, book, pay for their travel and identify and screen the various mobility options for undertaking their trips<sup>2</sup>.

In its Sustainable and Smart Mobility Strategy (2020), the European Commission recognised that technological change alone would not be sufficient to reduce CO2 emissions from transport. The broad deployment of new technologies takes time, and demand for transport will continue to grow. Hence, the shift requires changes in people's mobility behaviours in combination to enhancing physical well-being<sup>3</sup>.

### **The Benefits of strong European public transport systems<sup>4</sup>**

Public transport is one of the most sustainable and safe modes of mobility, bringing benefits to society as a whole. Up to 2020, the sector counted almost 60 billion passenger journeys per year in Europe, with numbers on the rise. Congestion is estimated to cost the European economy 1% of its GDP, or the equivalent of 100bn EUR per year. Public transport is essential to reducing congestion. Higher use of public transport even benefits road users as roads are emptier.

It is estimated that the transport sector can leverage urban development on a 5 to 1 ratio for every euro spent on transport. For example, investment in public transport has a spillover effect in terms of up to 25% of job creation compared to the same level of investment for roads or highway. Moreover, it is a key main local job creator within cities. For example, Metro Madrid, Wiener Linien in Vienna or Dopravní Podnik Hlavního Města Prahy in Prague employ respectively 7000, 8500 and 11 000 people within the urban area<sup>5</sup>.

In parallel, the local public transport sector aims to become more flexible as a mobility provider and ensure that public transport remains the backbone of sustainable urban

<sup>1</sup> UITP (November 2021) Better Urban Mobility: Getting it right with public Transport, EU Position Paper, <https://cms.uitp.org/wp/wp-content/uploads/2021/11/UITP-Position-Paper-on-Urban-Mobility-Framework.pdf>

<sup>2</sup> UTG and ARUP (March 2022) Equitable Future Mobility, ensuring a just transition to net zero transport, Report. Available at: [https://www.urbantransportgroup.org/system/files/general-docs/Arup%20UTG%20Equitable%20Mobility\\_final.pdf](https://www.urbantransportgroup.org/system/files/general-docs/Arup%20UTG%20Equitable%20Mobility_final.pdf)

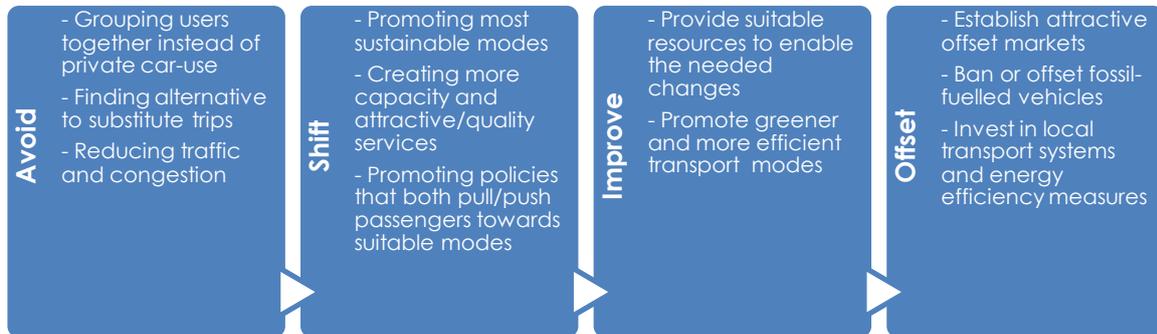
<sup>3</sup>UITP (2022) Public Transport Benefits, [https://assets.foleon.com/eu-west-2/uploads-7e3kk3/28686/ptbenefits\\_brochure\\_web.1ab7935d1ef3.pdf](https://assets.foleon.com/eu-west-2/uploads-7e3kk3/28686/ptbenefits_brochure_web.1ab7935d1ef3.pdf)

<sup>4</sup> UITP (2022) Public Transport Benefits, Mobility for (Y)EU – benefits for all <https://ptbenefits.uitp.org/pt-benefits/>

<sup>5</sup> UITP Diversity and inclusion toolbox, <https://mylibrary.uitp.org/Record.htm?idlist=330&record=19354052124911722349>



mobility. COVID-19 has made public transport companies to relentlessly seek to develop policies focused on winning back passengers. In parallel, much work has been undertaken to ensure and communicate about safety of transport networks<sup>6</sup>. For cities, it is crucial to re-gain citizens' trust in public transport and shift them away from private vehicles. For that purpose, it is paramount to ensure that all mobility policies focus on the 'Avoid, Shift, Improve, Pay principle' enabling a successful shift from cities and its citizens to transform the sector<sup>7</sup>.



To become reality, such objectives must be supported by partnerships/agreements between mobility providers and competent public authorities, and benefit from new, digital mobility services, and ensure that the customer remains at heart of all mobility-led strategies.

## 2.1 On becoming inclusive

The European Sustainable and Smart Mobility Strategy (2020) showcases the range of key actions for making new mobility solutions affordable, accessible, and safe for all passengers<sup>8</sup>. Initially, the concept of impaired accessibility was defined based on the medical condition(s) of an individual. For example, the 2018 UITP Accessibility guides highlights<sup>8</sup>:

- Blind/partially sights,
- Deaf/heard hearing,
- Speech impairments,
- Cognitive disabilities (intellectual, brain injury, etc),
- Mental health issues,
- Mobility impairments.

A more modern view on disability, however, also attributes impaired inaccessibility to social organisation, whereby barriers be they environmental, social, communication or

<sup>6</sup> UITP Joint Letter co-signed by CEEP, CER, UITP and Eurocities : "Public Transport during and after Covid-19

<https://www.uitp.org/publications/joint-letter-public-transport-during-and-after-covid-19/>

<sup>7</sup> UITP (November 2021) Better Urban Mobility: Getting it right with public Transport, EU Position Paper, <https://cms.uitp.org/wp/wp-content/uploads/2021/11/UITP-Position-Paper-on-Urban-Mobility-Framework.pdf>

<sup>8</sup> Accessibility in public transport. How bus, rail and waterborne can stay accessible to all, <https://www.uitp.org/topics/accessibility-in-public-transport/>



other are a matter of organizational structures<sup>9</sup>. As such, the transport ecosystem can re-examine how it self-organises to address when, how, and why passengers with different abilities, needs and access requirements encounter barriers during the transport experience.

### **The introduction of the European Accessibility Act 2019**

In 2019 the EU adopted the European Accessibility Act (EAA – Directive (EU) 2019/882) reflecting the obligations of the UNCRPD and complementing the web accessibility Directive (EU) 2016/2102<sup>10</sup> which entered into force the same year. The EAA aims to improve the trade between EU member countries for accessible products and services, by removing country specific rules, thus benefitting a) persons with disabilities and elderly people with more accessible products and services in the market at more competitive prices, and b) businesses with a greater market for accessible products and services. The laws, regulations and administrative provisions necessary to comply with the EAA Directive have to be adopted and published by the Member States by 28 June 2025<sup>11</sup>

The European Sustainable and Smart Mobility Strategy (2020) frames highlights key action areas to make the EU vision a reality, such as flagship initiative and paying due consideration to passengers with access needs<sup>12</sup>. Limited access to transport or mobility services makes goods and services inaccessible, leading to marginalization and inequalities further amplified by digital barriers<sup>13</sup>.

Within the EU, there are many examples and positive initiatives being deployed by the public transport sector, but they still fall short on users' expectations. Cities and transport networks have been focusing their efforts on ensuring that vehicle fleets are low floor, while other areas, remain unaddressed<sup>14</sup>.

### **Best practice: accessibility policies in the Berlin Public Transport**

BVG is a public operator for local public transport in Berlin, Germany, that operates underground trains, trams and buses in Berlin and in the surroundings. The BVG works with the S-Bahn and the local Deutsche Bahn AG (DB) rail network in the VBB fare network, making changes between the different modes of transport with just one ticket a simple matter. Together with DB trains, the VBB serves an operation area of almost 1,000 km<sup>2</sup> which is an area with 3.4 million inhabitants.

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<sup>9</sup> TRIPS project. Qualitative insights report, <https://trips-project.eu/wp-content/uploads/2020/10/TRIPS-D.2.2-Qualitative-Insights-report.pdf>

<sup>10</sup> [Directive \(EU\) 2019/882 on the accessibility requirements for products and services](#)

<sup>11</sup> TRIPS project. Report on Accessibility Standards and Legislation, <https://trips-project.eu/wp-content/uploads/2020/10/TRIPS-D3.3-Report-on-Accessibility-Standards-and-Legislation.pdf>

<sup>12</sup> Sustainable and Smart Mobility Strategy, European Commission, [https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12438-Sustainable-and-Smart-Mobility-Strategy\\_en](https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12438-Sustainable-and-Smart-Mobility-Strategy_en)

<sup>13</sup> UTG and ARUP (March 2022) Equitable Future Mobility, ensuring a just transition to net zero transport, Report. Available at: [https://www.urbantransportgroup.org/system/files/general-docs/Arup%20UTG%20Equitable%20Mobility\\_final.pdf](https://www.urbantransportgroup.org/system/files/general-docs/Arup%20UTG%20Equitable%20Mobility_final.pdf)

<sup>14</sup> UITP (January 2018) Travel for All, The Commitment of European Public Transport, UITP Europe, <https://cms.uitp.org/wp/wp-content/uploads/2020/08/UITP-2018-Travel-for-all-2.pdf>



BVG offers several ways of mobility support. There are several barrier-free information brochures and digital information tools. BVG makes every effort to constantly improve barrier-free access. Most of Berlin's 173 underground stations are already accessible with installed elevators or ramps. There are guidance systems for persons with visual impairment at more than 100 stations. The availability of elevators is set in an interactive network plan. There is a real-time timetable information available especially for barrier-free trips. Since 2018, BVG is testing various solutions to provide real-time acoustic passenger information at some selected bus and tram stops.

While there are numerous standards and regulations required to ensure that accessibility is considered in the conception and planning of traffic facilities and vehicles<sup>15</sup>, including the deployment of ramps or lifts facilitating wheelchair access, accessibility gaps pertain. These gaps have critical impact on the accessibility of disabled users' end-to-end journey, hindering them from accessing the full range of education, work and other social networking opportunities that could improve their quality of life.

To address these gaps, the transport sector and authorities are called to be more ambitious on changing urban dynamics in transport and urban planning for improving accessibility. This should be done based on holistic view of passenger needs and interactions with the physical and digital infrastructure and ensure that new mobility solutions satisfy them as much as possible. Therefore, a comprehensive measurement of transport accessibility, however, should consider the reduction of all barriers that hinder access or use of transport services. A long detour, an elevator out of order, incomplete travel planning information becomes a barrier to and demotivates use of public transport and diminishes disabled users' ability to travel independently and their fundamental right to autonomy and privacy as they require special assistance from another person<sup>16</sup>. Hence, the concept of accessibility should include access to and use of buildings, station facilities, booking systems and information services and even all aspects of service provision provided by transport staff.

The local circumstances and passengers' wish will need to be properly considered to make the choice between soft (human assistance, dedicated transport services, digital tools) and hard (work on the infrastructure) measures, or mix both

### **Focus on Passengers with Reduced Mobility (PRM)**

Transport systems have been traditionally designed for active people in good health (and providing access mainly to work and education) This had repercussion on the data collected about journeys, the way that transport projects were appraised and the composition of the transport workforce, particularly at decision making level. In parallel the appraisal of projects, criteria for funding also frequently reflected this, focusing on journey time savings, for example, rather than inclusion considerations.<sup>17</sup>

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<sup>15</sup> TRIPS project. Qualitative insights report, <https://trips-project.eu/wp-content/uploads/2020/10/TRIPS-D.2.2-Qualitative-Insights-report.pdf>

<sup>16</sup> TRIPS project. Report on Mobility Services Trends Impacts and Related Policies, <https://trips-project.eu/wp-content/uploads/2020/10/TRIPS-D3.1-Report-on-Mobility-Services-Trends-Impacts-and-Related-Policies.pdf>

<sup>17</sup> UTG and ARUP (March 2022) Equitable Future Mobility, ensuring a just transition to net zero transport, Report. Available at: [https://www.urbantransportgroup.org/system/files/general-docs/Arup%20UTG%20Equitable%20Mobility\\_final.pdf](https://www.urbantransportgroup.org/system/files/general-docs/Arup%20UTG%20Equitable%20Mobility_final.pdf)



From a new engineering perspective, *Passengers with Reduced Mobility* (PRM) encompass persons who are limited in their ability to move compared to an adult who is not facing such limitations. These limitations may include experiencing difficulty in orientation and navigation through public space, slower walking pace or slower movement in general, inability to climb stairs, risk of falling down or excessive fear, etc.<sup>18</sup>

There is growing awareness in the sector of gaps in data and in understanding of the lived experiences of different groups as well as the need to review appraisal methods. Transport organisations also recognise that their workforce, including at the most senior management level, must better mirror the communities that they serve. A key instrument for fostering accessibility is to apply general principles of “universal” design. For example:

- The **two-channel principle** suggests that we should transmit or trigger information and actions via at least two channels, e.g., different types or positions of control elements.
- The **two-senses principle** suggests that information must be accessible for at least two of the three senses seeing, hearing and touching to ensure that sensory impaired people receive the same information.

These principles can guarantee that public transport can be designed or redesigned to eliminate barriers for persons with disabilities and allow them to enjoy the benefits of transport on an equal basis to other passengers. To ensure these principles are respected in practical implementations, access and usability should be tested by people with different types of disabilities using concrete travelling use cases or scenarios.

### 3. Overview of Stakeholders

When designing future transport systems, it is important to consider all the parameters of end-to-end accessibility of someone’s journey, given their physical, sensory or other impairments, not limited to infrastructure and rolling stock provisions and to analyse the end-to-end organisation of the transport ecosystem in its entirety. This has implications on the range and involvement of stakeholders to ensure that all aspects of accessibility pre-conditions and required settings are well-taken into account from the customer-perspective in the mobility chain.

Regulators, mobility providers, passengers, interest groups and complementary industry representatives should also be involved throughout the strategic, operational, tactical decision-making process. This allows taking the strategic and the operational decisions required to make optimised accessibility a reality in a given case on the basis of the various factors affecting the accessibility of infrastructure, assets, digital tools, and customer management.

The deployment of modern technologies and innovative ICT (Information and Communication Technology) tools have brought significant spill-over effects to the public transport sector. The range of impact of such technologies’ intake has had profound effect. Whether they support the cost-effectiveness of operations and maintenance tasks, support a more agile planning and service planning, or enable a better interaction from

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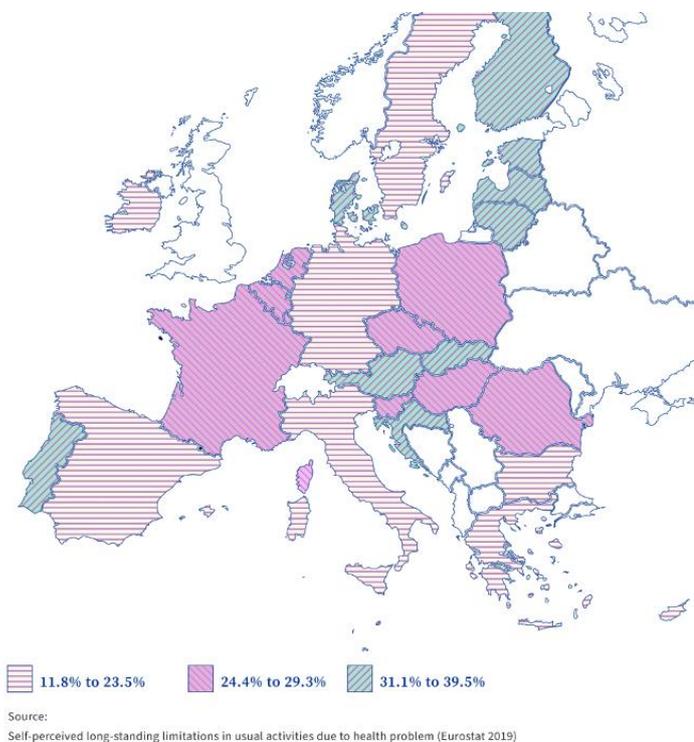
<sup>18</sup> UITP (July 2019) Accessibility in Metro Systems, Final report, Metropolitan Railways Division Operations Subcommittee.



the passenger perspective, focusing on the passengers with disabilities, the improvement in the travel experiences, including enhancing safety and bridging disabled people's mobility gaps.

### 3.1 Knowing our market: from niche to mainstream

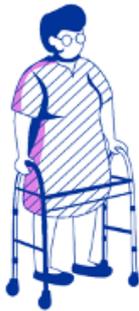
Central to addressing the accessibility is understanding market needs and behaviours and the market potential. Persons with disabilities are the largest minority group. According to WHO over 1 billion people are estimated to live with some form of disability. In total 135 mil people in Europe live with a disability although its prevalence differs from country to country.



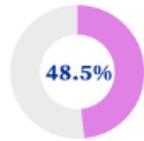
The prevalence of disability in Europe is expected to rise due to chronic conditions, and most recently due to the impact of long-Covid, but more importantly due to Europe's aging demographics. This aging trend is pervasive throughout the world and for this reason, it is necessary to find mobility solutions suitable for both the elderly and persons with disabilities.



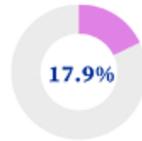
## The older you get, the more likely you are to have a disability



48.5% of people with disabilities in the EU are aged 65+ and 17.9% are aged 16-65



65+ year olds



16-65 year olds

Figure 1: European Council of the European Union<sup>19</sup>

Understanding the market requires in-depth knowledge of the user-centric needs and interactions to the use and relations with urban mobility infrastructure.

In 2020 TRIPS conducted a survey gathering insights from persons with disabilities in 21 European countries aimed at understanding their mobility patterns, preferred means of transport and attitudes towards nine future mobility solutions. In 2022, we repeated the survey include non-disable participants and targeted the elderly to establish commonalities and difference in their views.

Our survey established similarities in modal preferences and frequency of use, with cars remaining the most preferred mode for both groups, followed by buses and trains/trams/metros/subways. Interestingly, disabled users use taxis more often than the elderly indicating a higher degree of reliance on taxis to compensate perhaps the fact that almost 12.3% of them cannot use or have access to a private car.

Table 6: Modal preferences by persons with disabilities in Phase 1 and Phase 2 and elderly cohorts in Phase 2 (only).

	<u>daily</u>	<u>several times a week</u>	<u>several times a month</u>	<u>few times a year</u>	<u>never</u>	<u>not able</u>
<b><u>car</u></b>						
<b><u>Persons with disabilities</u></b>	<u>25.1%</u>	<u>22.1%</u>	<u>15.2%</u>	<u>12.7%</u>	<u>12.7%</u>	<u>12.3%</u>
<b><u>Elderly (65+)</u></b>	<u>24.1%</u>	<u>40.7%</u>	<u>13.0%</u>	<u>5.6%</u>	<u>16.7%</u>	<u>0.0%</u>
<b><u>bus</u></b>						
<b><u>Persons with disabilities</u></b>	<u>14.3%</u>	<u>15.6%</u>	<u>13.9%</u>	<u>28.0%</u>	<u>19.3%</u>	<u>8.9%</u>

<sup>19</sup>Infographic - Disability in the EU: facts and figures. <https://www.consilium.europa.eu/en/infographics/disability-eu-facts-figures/#:-:text=87%20million%20Europeans%20have%20some.1%20in%204%20European%20adults>



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<b><u>Elderly (65+)</u></b>	<u>1.9%</u>	<u>27.8%</u>	<u>14.8%</u>	<u>25.9%</u>	<u>29.6%</u>	<u>0.0%</u>
<b><u>train / metro / tram / subway</u></b>						
<b><u>Persons with disabilities</u></b>	<u>11.6%</u>	<u>13.2%</u>	<u>11.9%</u>	<u>30.2%</u>	<u>25.5%</u>	<u>7.6%</u>
<b><u>Elderly (65+)</u></b>	<u>1.9%</u>	<u>24.1%</u>	<u>14.8%</u>	<u>13.0%</u>	<u>46.3%</u>	<u>0.0%</u>
<b><u>bike e-bike</u></b>						
<b><u>Persons with disabilities</u></b>	<u>2.7%</u>	<u>5.1%</u>	<u>5.4%</u>	<u>8.1%</u>	<u>46.1%</u>	<u>32.5%</u>
<b><u>Elderly (65+)</u></b>	<u>16.7%</u>	<u>18.5%</u>	<u>7.4%</u>	<u>3.7%</u>	<u>51.9%</u>	<u>1.9%</u>
<b><u>taxi</u></b>						
<b><u>Persons with disabilities</u></b>	<u>1.1%</u>	<u>4.2%</u>	<u>12.5%</u>	<u>43.6%</u>	<u>32.0%</u>	<u>6.7%</u>
<b><u>Elderly (65+)</u></b>	<u>0.0%</u>	<u>0.0%</u>	<u>1.9%</u>	<u>40.7%</u>	<u>57.4%</u>	<u>0.0%</u>
<b><u>specialized or adapted transport</u></b>						
<b><u>Persons with disabilities</u></b>	<u>3.4%</u>	<u>4.9%</u>	<u>5.6%</u>	<u>17.7%</u>	<u>61.7%</u>	<u>6.7%</u>
<b><u>Elderly (65+)</u></b>	<u>0.0%</u>	<u>0.0%</u>	<u>1.9%</u>	<u>3.7%</u>	<u>92.6%</u>	<u>1.9%</u>

What are people's most common accessibility complaints? Getting on and off a means of transport remains the most difficult aspect of disabled people's journey, followed by reaching an access point like a train station or a bus stop indicating first mile issues around the accessibility of urban infrastructure, accessing station facilities (such as toilets, service desks, ticket points) and delays in travel due to inability to board a means of transport, comfort during traveling and access to travel information. Another barrier carrying quite a bit of emotionality for people is other passengers and transport staff's willingness to help them and accommodate their needs, which points to the need for staff training but also public campaigning for an inclusive travelling etiquette.



	Comfort	Convenience	Security	
TOTAL	64	33	3	57
Reaching transport access point	64	33	3	57
Using facilities and supporting infrastructures	58	16	3	8
Getting on and off the mean of transport	80	52	4	51
Comfort on board	53	4	4	
Be oriented	13	4	0	
Finding information	19	4	1	
Using intermodal facilities	2	4	0	
Easy driving of shared vehicles	0	4	0	
Social barriers	33	4	0	
Surrounding environment	16	4	0	
Limited access to information	52	4	0	
Inconveniences in emergency situations	4	4	0	
Outage of the regular operations	4	4	0	
Impact of the pandemic restrictions	4	4	0	
Risks on the way to the transport access point	3	4	0	
Risks at the transport access point	3	4	0	
Risks on board	4	4	0	
Risks in Emergency situations	0	4	0	
Pandemic related risks	1	4	0	
Risk of incident while driving shared vehicles	0	4	0	
Travel Time	57			
Affordability	8			
Autonomy	51			

Figure 2: Frequency of accessibility complaints

When it comes to future mobility systems, are the attitudes of persons with disabilities fundamentally different from other sections of the population? And if so, in what respect we should beg due consideration?

When comparing the attitudes towards future mobility solutions of persons with disabilities to those of non-disabled and elderly citizens, the following commonalities and difference transpired with respect to their intension to use them.

Our findings suggest that in relation to the intention to use certain mobility systems the views of persons with disabilities coincided with those of other non-disabled and elderly cohorts. As such, ride-pooling and microtransit seem to be equally acceptable by more than 60% of the respondents and robotaxis by approximately 70% across all groups. These findings point to the need ensure the accessibility of those systems for everyone but also the need for wider and deeper engagement of elderly and persons with disabilities in the design of the vehicles, the services and the customer interfaces.

Perhaps a little surprisingly, an accessible journey planner would motivate most respondents irrespective of disability perhaps indicating the need to include accessibility information in mainstream transport planners to improve service provision overall.

Table 10: Comparison between persons with disabilities, Non-disabled and Elderly cohorts

mobility solution	Non-disabled	Persons with Disabilities	Elderly
Accessible journey planner	73.5%	77.4%	53.7%
Bike sharing	54.5%	19.4%	14.0%
Cable car	61.4%	62.2%	43.0%
Cycle lane	79.5%	50.7%	53.7%



This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme Under Grant Agreement no. 875588

<b>E-scooter</b>	36.4%	12.9%	5.0%
<b>Microtransit</b>	65.2%	67.7%	67.8%
<b>Motorbike taxis</b>	20.5%	14.3%	7.4%
<b>Ride-pooling</b>	63.6%	62.7%	67.8%
<b>Robotaxi</b>	74.2%	68.2%	76.9%

**Similarities across all user groups:** This comparative analysis yields some interesting general insights regarding the acceptance of future mobility solutions. **Ride-pooling** seems to be equally acceptable across all user groups; non-disabled (63.6%); persons with disabilities (63.7%) and elderly (67.8%), as is **micro-transit**; non-disabled (65.2%); persons with disabilities (67.7%) and elderly (67.8%) **Robotaxis** are equally accepted across groups to an extent; non-disabled (74.2%); persons with disabilities (68.2%) and elderly (76.9%). This finding indicates the prospects of on-demand mobility and autonomous vehicles across society, and we should ensure that the accessibility needs of those groups are catered for. This in effect points to the need for wider and deeper engagement of elderly and persons with disabilities in the design of the vehicles, the services and the customer interfaces.

**Similarities between persons with disabilities and non-disabled user groups:** **Accessible journey** planners are favoured by both persons with disabilities (77.4%) and non-disabled (73.5%) user; yet a bit less so by the elderly (53.7%). The same is true for **cable cars** favoured by persons with disabilities (62.2%) and non-disabled (61.4%) users; yet a bit less so by the elderly (43%). The two groups share similar views on **motorbike taxis** with 20.5% of non-disabled and 14.3% of persons with disabilities willing to use them in contrast to only 7.4% of the elderly.

**Similarities between persons with disabilities and elderly user groups:** **Bike sharing** is equally non-favoured by persons with disabilities (19.4%) and elderly (14%) users; whereas 54.5% of non-disabled respondents would use them. **E-scooters** are also least favoured with only 12.9% of persons with disabilities and only 5% of the elderly users declaring that they would use them, whereas 36.4% of non-disabled users would. The two groups share similar view on **cycle lanes** with 50.7% of persons with disabilities and 53.7% of the elderly willing to use them, whereas 79.5% of non-disabled respondents would use them. Findings indicate that we need to rethink the accessibility requirements and our investment in cycling infrastructure given our aging demographic in Europe.

### 3.2 Assistive technology: Unlocking its potential for urban mobility

Assistive Technologies (AT) are technologies that assist persons with disabilities in all aspects of their daily life and are the subject of significant research and development efforts<sup>20</sup>. Typical examples are wheelchairs and white canes.

A range of possibilities can be unlocked by utilising advances in AT to improve accessibility in urban mobility. Smart versions of assistive technologies, like electric and digitally enabled wheelchairs and smart, GPS-enabled canes, augmented reality glasses,

<sup>20</sup> TRIPS project. Report on Assistive Technologies Trends Impacts and Related Policies, <https://trips-project.eu/wp-content/uploads/2020/10/TRIPS-D3.4-Report-on-Assistive-Technologies-Trends-Impacts-and-Related-Policies.pdf>



sensor enabled wearables, assistive robots and many more solutions based on the Internet of Things (IoT) can improve access to transport services and even bridge the gap of infrastructure upgrades<sup>21,22</sup>.

On-board virtual assistants, for example, could use artificial intelligence (AI) to understand voice instructions by those with speech impairments and translate them into command for voice activated vehicles, or observe the surrounding environment and narrate the journey and key landmarks along the way for persons with visual impairments, or communicate transport announcement in visual way for people with hearing difficulties, and even improve road safety by alerting persons with disabilities in a personalised way to avoid accidents and increase psychological safety. Also, journey planning assistance may be provided ahead of the journey to plan an accessible route according to one's impairment. Examples like Pre-trip Concierge and Virtualization (PTCV) aim to provide all the necessary information to disabled people and/or their caregivers both before and during a trip.

### Best practice : Wiener Linien Avatar<sup>23</sup>

There are around 10,000 deaf people in Austria and 500,000 in Europe, and for them, the sign language is their mother tongue and information in spoken language is often difficult, if possible, at all, to understand. To make travelling more accessible for hearing impaired travelers, Wiener Linien created a virtual assistant Iris which provides travel-related information in sign language. Passenger information in public transport is highly standardized. Wiener Linien takes advantage of this with the sign avatar: the approximately 5,000 stations in the Wiener Linien network and around 30 types of disruption can be translated in advance. In the unexpected circumstances, the information is translated almost live and automatically from spoken to sign language. The animated videos are to be played back in the WienMobil app, which accompanies through their everyday public transport with digital tickets and passenger information. The app is currently in the pilot phase; tests are to be carried out in autumn 2023 to see whether the new program can be integrated into the existing WienMobil app. If this research phase is successful, the application will be rolled out over the next one to two years.

## 3.3 Standardisation: A key driver for levelling the playing field

Standardization has a key role in ensuring not only that laws are well integrated but deployed in the most harmonised and consistent manner across Europe<sup>24</sup>. Standards

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<sup>21</sup> UITP (November 2020) The Internet of Things in Public Transport, Knowledge Brief, <https://cms.uitp.org/wp/wp-content/uploads/2021/01/IOT-KB-final.pdf>

<sup>22</sup> TRIPS project. Report on Assistive Technologies Trends Impacts and Related Policies, <https://trips-project.eu/wp-content/uploads/2020/10/TRIPS-D3.4-Report-on-Assistive-Technologies-Trends-Impacts-and-Related-Policies.pdf>

<sup>23</sup> Weltneuheit: Avatar soll Störungen im Wiener Öfnetz in Gebärdensprache übersetzen (2022). Available at: <https://www.wienerlinien.at/geb%C3%A4rdenavatar-pr%C3%A4sentation>

<sup>24</sup> The concept of **Standardization** is defined as the “activity of establishing, with regard to actual or potential problems, provisions for common and repeated use, aimed at the achievement of the optimum degree of order in a given context”. Whereas a **Standard** is defined as “document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results...” as aimed at by standardization. Therefore, not following standards can be seriously harmful to results in R&D or technical development. In TRIPS project. Report on Accessibility Standards and Legislation, <https://trips-project.eu/wp-content/uploads/2020/10/TRIPS-D3.3-Report-on-Accessibility-Standards-and-Legislation.pdf>



support market-based competition and help to ensure the interoperability of complementary products and services. They reduce costs, improve safety, and enhance competition.

The concept of accessibility should be not excluded from this exercise, several EU projects have developed collections or produced databases/platforms of information on standards in the field of accessibility<sup>25</sup>. From a review across standards, about 150 can be easily identified as being related to accessibility and AT. However, the scope of applications of these standards is often unclear, and there are in addition thousands of standards on technologies, that are of significant benefit for persons with disabilities, which creates a lot of difficulties to select the appropriate standards. Moreover, the number of committees standardizing accessibility-related subjects is constantly increasing, but it lacks a mechanism to organize cooperation and coordination across many committees and SDOs (Standard Development Organisations). Knowing that the implementing situations are very diverse, it is a challenge to identify which local/national specifications applied to local public transport systems could be harmonised into standards at EU level and for which applications (road- and/or rail-based transport (sub)modes and networks, greenfield and brownfield lines...). Regulators and industry leaders as well as mobility service providers should reconsider their role and insistence in clarifying and integrating harmonised accessibility technical measures to improve accessibility and interoperability, motivate accessibility innovation in the ecosystem and levelling the playing field for socially responsible transport operators.

## 4. Co-creating an accessible and inclusive urban mobility

### 4.1 Understanding a city's urban mobility inclusivity gaps

Not all cities face the same issues, each local situation is specific for very numerous reasons (e.g. physical, geographical, historical, economical, demographical, cultural and social background). To address the accessibility issues of a city, the municipality, transport providers and authorities should collect information about the current and foreseeable accessibility issues of persons with disabilities in their constituency.

Hence, every accessibility journey should start with creating strong working relationships with the local communities and user research into the barriers faced by people. Another untapped source of such information is the citizen complain databases of municipalities and customer complain databases of transport operators. A common perception of persons with disabilities is that their feedback is not considered, and accessibility becomes a self-auditing exercise based on operational KPIs and driven by legal compliance, as opposed to customer service. Collection of hard evidence and user insights on the end-to-end accessibility of transport infrastructure and services and prioritise investment for maximum impact can also be facilitated by the deployment of the MDI app<sup>26</sup> with various communities of persons with various disabilities to understand the city's pain points (for more information on the MDI app see: <https://mdi.tbridge.it/>)

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<sup>25</sup>TRIPS project. Report on Accessibility Standards and Legislation, <https://trips-project.eu/wp-content/uploads/2020/10/TRIPS-D3.3-Report-on-Accessibility-Standards-and-Legislation.pdf>

<sup>26</sup> Official website of MDI app, <https://mdi.tbridge.it/>



Once these are identified and scoped, best practices and initiatives from other cities can inform a city’s strategy to tackle them without re-inventing the wheel. Nevertheless, a user-centred approach should be adopted to validate the suitability of existing solutions, to adapt or create new services, to prioritise potential measures, and even to integrate mobility services with currently used AT solutions – devices and services.

In the past, and even now, one can see accessibility often addressed like the “elephant in the room”, with each organisation in the transport ecosystem seeing and addressing the issues they consider to lie within the scope, strategic priorities, legal requirements, and financial capabilities of the organisations. While this led undoubtedly to progress over the years, results have been suboptimal from a customers’ point of view targeting end to end accessibility to reach their destination. Perhaps another way to breakdown the complex issue of addressing accessibility into manageable chunks is to deconstruct the journey into phases (see fig. 3 below) representing the different passenger activities and interactions with the transport system.

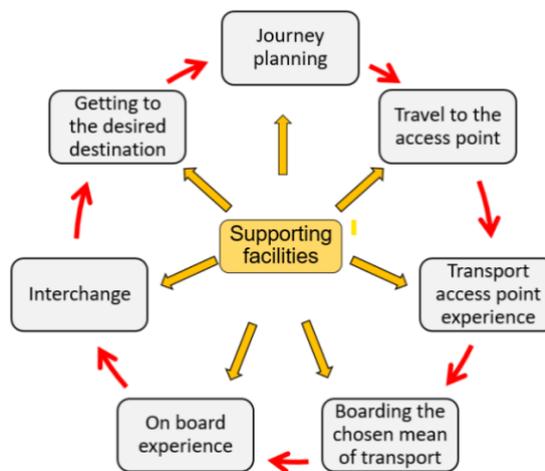


Figure 1 - Typical phases of a journey<sup>27</sup>

This will enable the different stakeholders in the transport ecosystem to interact with users to understand their issues in relation to these activities, understand their own role and potential contribution in addressing it, import and test the suitability of existing solutions and/or assess the gaps for which new solutions should be developed to address issues from the user’s perspective<sup>28</sup>.

## 4.2 Co-design: The right approach to finding the right solution

Co-Design methodology is a way of working underpinned by an ethos of respect for everyone involved. Co-design empowers all actors in the process and particularly for users to participate fully based on shared knowledge and equal partnerships.

<sup>27</sup> TRIPS project. User Evaluation and Design concepts, <https://trips-project.eu/wp-content/uploads/2021/04/D4.2-User-evaluations-and-Design-Concepts-TRIPS.pdf>

<sup>28</sup> TRIPS project. Quantitative survey report (1<sup>st</sup> version), <https://trips-project.eu/wp-content/uploads/2021/04/D2.3-Quantitative-survey-report-1st-version-TRIPS.pdf>



To involve persons with disabilities as active participants from the beginning of the innovation process is strategically and economically wise, and the practicality of this involvement should be considered at every step of the process. Their participation can support the development of intuitive designs that respect users' range of abilities, require minimal requirements for upskilling and can be readily adopted to maximize impact.

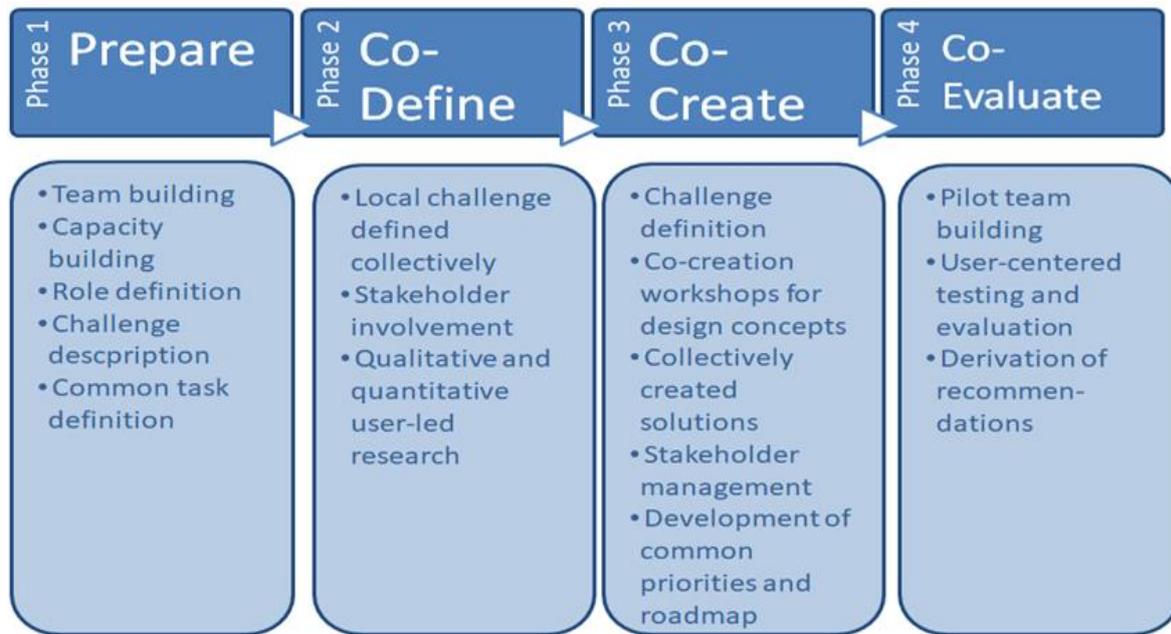


Figure 2: The four phases of the co-design process

The Co-Design process in TRIPS was divided into four iterative phases. In the Prepare phase (WP2), working groups were formed to facilitate citizens of the seven cities to participate in the project. In the Co-produce phase (WP2 and WP3), working groups and researchers examined end-user perspectives on transport barriers based on reviews of previous research, content analysis of social media posts and qualitative interviews, a survey on disabled people's mobility behaviours and ICT use and attitudes towards future mobility systems and related ICT and AT technologies. The next Co-create phase (WP4 and WP5) engaged users and representatives of the transport ecosystem in brainstorming mobility concepts and assessing their potential impact to address identified barriers and challenges and their feasibility in terms of help municipalities on their journey to accessible inclusive digital mobility. Finally, the Co-evaluate phase (WP6) created solutions or mockups, which were evaluated by the users.



## Best Practice: TRIPS project – Developing accessible mobility solutions

Throughout the project, each of the seven city partners tackled accessibility issues specific to their cities (Brussels, Bologna, Cagliari, Lisbon, Sofia, Stockholm and Zagreb). As a result, each city focused on a different mobility solution<sup>29</sup>

The Bologna group focused on producing a series of recommendations on how to improve the overall accessibility of public transport in the city. The team in Brussels designed an Accessible Journey Planner application based on the existing public transport journey planner in Brussels, the STIB Trip planner. Cagliari set out to map the accessibility information of a number of core bus routes (hospitals, schools, services and so on) as selected by the persons with disabilities in the group. The results are currently being uploaded to BusFinder<sup>30</sup>, the official CTM's App. The Lisbon group set out to work on two parallel solutions: first, to implement accessibility information in the existing Carris app travel application; and second, to provide recommendations to improve the existing ticketing system's usability. The group in Sofia decided to focus on providing recommendations on making bus stops accessible (fig.6 and fig.7). Stockholm focused their efforts in outlining what travel support with personalised information could be like in Stockholm (fig.8). This resulted in the requirements for a solution that provides travel support with personalised information for each traveller. Finally, Zagreb set out to deliver a personalized, accessible digital journey planner providing real-time information on location of buses/trams/trains, accessibility of individual vehicles, tram/bus/train stops and related facilities. This contributes to the [Accessible Zagreb service](#)<sup>31</sup>.

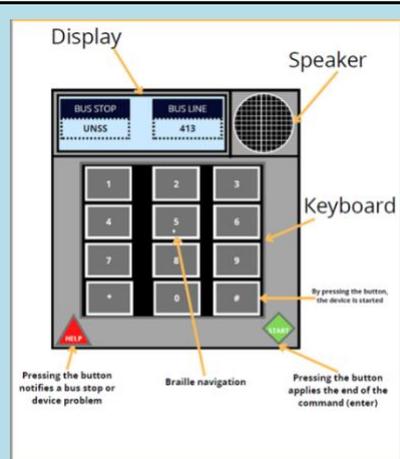


Figure 3: Mockup of Sofia's accessible bus stop



Figure 4: Mockup of Sofia's accessible bus stop

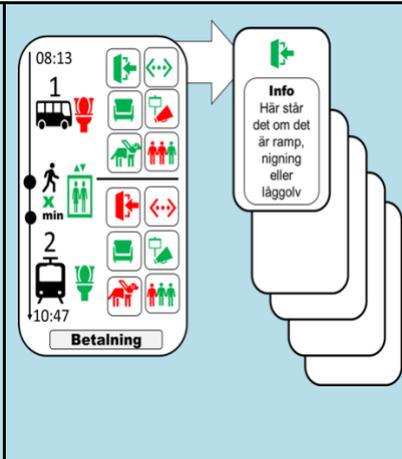


Figure 5: Mockup of Stockholm's EDS App designed by Stockholm team

Participatory methodologies are by default iterative and resource intensive, yet superior in tackling complex issues, gaining the acceptance of those involved, and developing appreciation for each other's perspective that can go a long way, beyond the remit of an accessibility initiative. While working with the local teams, the process unfolded as a series of regular 1:1 sessions, involving semi-structured interviews, open-ended

<sup>29</sup> TRIPS project. Deliverable D6.1. Prototypes of inclusive mobility solutions and validation.

<sup>30</sup> More information about the BusFinder app: <https://www.ctmcaagliari.it/en/busfinder>

<sup>31</sup> More about the "Accessible Zagreb", <https://pristupacni.zagreb.hr/>



activities, writing exercises, surveys, offline activities and other qualitative methodologies to gain insight. The focus was on creating a dynamic working rhythm and generating mechanisms that allow for heterogeneous interests and in-depth understandings to come forward.



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## Recommendations for applying Co-design in practice<sup>32</sup>

### ➤ Nurture co-ownership

Co-design is about having shared ownership of a project. This entails that the people that will be most affected by a change process need to be involved as early as possible so they can shape it from the beginning and ownership can be nurtured throughout.

#### Principles and application guidelines:

- Involve participants in the entire project.
- Create co-ownership from the beginning.
- Provide support to nurture the continued involvement and commitment in the project.

### ➤ Create a truly collaborative working process

A significant amount of effort is required to implement and maintain a fully collaborative working process. These efforts are emergent and often unaccounted for in the original work package borders. Put a lot of effort into creating, implementing and maintaining an internal working process.

#### Principles and application guidelines:

- Invest in onboarding from the beginning.
- Be aware that these efforts are emergent and often unaccounted for.
- Translate the project's formal structure into actionable and clear tasks.
- Be explicit and descriptive about how you are going to work together.
- Continue to implement, monitor and improve your processes regularly and collaboratively.

### ➤ Harness the power of motivation

Monitoring what is motivating people and how that changes throughout the project is an important aspect of collaborative working.

#### Principles and application guidelines:

- Identify individual/group motivations and create a shared understanding of how these relate to broad project goals
- Monitor how what is motivating people changes through the project.
- Engage with friction and frustration as it emerges.

For guidance on how to implement the TRIPS approach, the Co-design for All toolkit<sup>33</sup> provides an overview of the main methods that have been co-created and piloted with seven participating cities in the project. The toolkit provides training material exercises, templates and guidelines organised into six modules on how to:

1. Identify who needs to be involved in your project
2. Create a research plan and set up a collaborative working structure
3. Create an identity and a vision statement as a group
4. Identify a problem to address and define a clear scope for action
5. Come up with a change proposition as a group

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<sup>32</sup> MOOC: Co-design for All: doing co-design in practice, <https://www.coursera.org/learn/co-design-for-all>

<sup>33</sup> TRIPS project. Co-design for All toolkit, <https://trips-project.eu/co-design-for-all-toolkit/>



## 6. Documenting and communicating your work

The Co-design for All toolkit delivers a set of practical methods and templates on how to weave the perspectives of persons with disabilities, transport operators and policy makers, combined with the local barriers and the technical solutions, through co-production and co-design.

# 5. Roadmap

## 5.1 Adopt a participatory innovation approach

Perhaps the most fundamental change for the transport sector is a change in the adopted innovation approach. A participatory, co-design methodology is paramount for accessibility innovation. The inability to perceive or interact with the world in the way persons with disabilities do (blind, deaf or people on wheelchair), on top of appreciating their complex set of priorities, needs and anxieties, can lead transport designers, planners and operators to costly mistakes and ineffective use of accessibility funds that will bear little impact on their disabled passengers' lives.

### **Opportunities for the transport sector:**

1. The method itself is a great learning opportunity. There are some of the opportunities: Cooperating directly with the users with disabilities provides direct feedback on the identification of the barriers and opportunities felt across the journey chain. Such cooperation with users has already proven to be successful in many cases and could be more broadly implemented.
2. Co-Design methodology also enforces a proactive attitude vis a vis transport operators and political parties involved in the project. It helps to build up the efficient dialogue and connections between the users with disabilities and transport providers and other institutions, such as city municipalities and researchers.
3. The whole transport ecosystem can benefit from peer networks and support and gain a new sense of purpose. Co-design allows building long-term connection between partners and the process can be very motivating for all parties involved.
4. Co-design can make services a better fit for the persons that use them. It can make an institutional situation feel more human, which is very important when creating accessible and inclusive future transport services.
5. Co-design methodology works well, and the main opportunity is that local teams keep working together and the connections established with the local transport stakeholders keep helping to carry on the local projects taking into account local conditions, needs and expectations.
6. The methodology was transferred into the MOOC (I.e., Massive Online Open Course)<sup>34</sup> which is available for everyone interested in implementing in co-design methodology in their own local realities.

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<sup>34</sup> MOOC: Co-design for All: doing co-design in practice, <https://www.coursera.org/learn/co-design-for-all>



7. The business cases were developed for the further development and funding of resulting solutions. To this end, once technically validated through in-situ testing and/or UX tested by local users, the inclusive digital mobility solutions will be evaluated under different perspectives in order to: (1) Estimating how the implementation of new mobility service(s) will contribute to improving inclusivity of the local transport system; (2) measure the impact that the designed solution deployment will have in terms of increased accessibility of the local transport system; (3) understand the actual conditions and constraints for their viable implementation.

### Challenges for the transport sector

- Sometimes there is a limited collaboration among the several associations operating in the city.
- A long-lasting commitment of all parties involved to the local team is very important in order to ensure the best possible outcomes and the efficiency of the team.
- Clear and open communication is crucial. Lack of it between the parties can lead to some dispersion.
- It might be challenging to involve persons with some specific disabilities like sensory disabilities (e.g., persons with hearing impairment) and intellectual disabilities, but collaboration with them could be the key in making the transport system truly accessible and inclusive.
- Raising the public awareness and looking for new investors and funds lead for future developments.

## 5.2 Commit to a new set of organisational values

Transport organisations require a new set of inclusive organisational values to drive the alignment of strategic decisions and everyday practice towards responsible innovation and transformation. Following consultation, the TRIPS project puts forward the '**Lecco declaration for Accessible and Inclusive Public Transport**', a crucial framework aligning key principles that organisations can build on to improve their own implementation of accessibility and support the realisation of accessible public transport<sup>35</sup>.

### Core concepts

- Freedom of movement is a human right and personal mobility should be guaranteed to all.
- Mobility is related to other rights such as participation, access to education and employment.
- Public transport supports social and environmental policies and values. It connects places and people and fosters social and economic development. Everyone should be able to use it.

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<sup>35</sup> For more information on the Lecco Declaration Accessible and Inclusive Public Transport, please follow this link <https://www.uitp.org/topics/accessibility-in-public-transport/>



- Technological developments have the potential to reduce or overcome access barriers providing new solutions.

### Principles:

1. Making public transport in European countries fully accessible and barrier-free (both physical and digital infrastructure) should be a key priority for sustainable urban mobility.
2. Accessible mobility should be understood to enable all passengers to access the transport system independently, through adapted urban and transport infrastructure, digital services and equipment or through the use of human assistance,
3. The passenger experience should be a key criterion when developing and deploying accessible mobility policies.
4. The opportunities provided by technology, including assistive technology, to overcome barriers should drive innovation in the transportation sector, enhancing accessibility and inclusion while safeguarding privacy and avoiding new barriers.
5. Cooperation and dialogue between all stakeholders and representative organisations should be promoted to ensure an accessible public transport network. They should be involved from an early stage of planning throughout the development and implementation process.
6. New urban mobility projects should respect all relevant EU legislation that supports a fully accessible system and be designed according to universal design principles.
7. Physical and digital accessibility and inclusive transportation training should be an integral part of training for transport professionals tailored and related to their specific roles.
8. Good practices should be shared, and technology transfer in the field of accessible transportation between countries should be encouraged to support replication.

The consortium has engaged key representatives within disability organisations, transport, and assistive technology experts, and continues to invite the signing of the declaration as an act of public commitment towards inclusivity and participation in accessibility innovation. The link to the Lecco declaration can be found [here](#).

### 5.3 Set inclusive innovation priorities

Throughout WP6 the local user groups, representing different types of disabilities, and transport providers worked together for more than 14 months in seven project cities partners have worked on designing and developing inclusive mobility solutions by implementing the co-design methodology. The co-design methodology was a win-win approach to enable the city partners to achieve the maximum results. Indeed, this approach helped to bring out the real needs of local user groups and to allow them to bring these on the table with the local transport stakeholders. In the process, a set of systemic innovations were suggested as key drivers for the sectors mobilisation towards inclusivity. These transpired in a series of consultations with transport operator representatives within the membership of UITP.

1. **Integration of needs at the heart of mobility strategies**



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- a. Highlight the need to provide a service to all passengers and understand the scope such changes entail, i.e., all passengers touchpoints (e.g., digital communications)
  - b. Promote a universal design and step-free approach in greenfield projects
  - c. Ensuring needs are recognized and integrated from the onset in the contract, ensuring availability of funding as opposed to ad-hoc requests
- 2. Aligning governance and stakeholders' interests**
- a. Identified as a key barrier in the promotion and deployment of solutions (eg new lift in a station)
  - b. Support dialogue between stakeholders, especially operators and authorities but must also include government and asset owners
- 3. Harnessing the use of digital tools, infrastructure and staff and mix them together**
- a. Using technology as well in the physical infrastructure to support or assist PRMs during their trips
  - b. Understand the role of digital tools for communications and the needs/interest of passengers (especially for assistive travel tools)
- 4. Education of passengers, persons with disabilities and drivers**
- a. Using education campaigns to provide tools and ownership to persons with disabilities to be able to use the system as independently as possible
  - b. Establish communication channels between passengers, groups, operator and competent authorities
  - c. Management of expectations
- 5. Promotion of companies to internalize population's needs and changing demographics**
- a. Inclusive hiring to support the identification of unidentified/unmet needs
  - b. Enable the participation of accessibility experts, civil representatives and development of internal structure to revise and audit accessibility in operations, new projects and development of new policies/strategies
- 6. Necessary advances in EU legislation**
- a. Support the tendering of rolling stock with good design
  - b. Principles should be well framed and communicated
  - c. No clear standards to access digital services but also how to use them and development of guidelines/recommendations
  - d. Understand the role and framing of accessibility laws
- 7. Enabling the industry to lead with design but being mindful of products lifecycle** and that these are long-term decisions which cannot be improved immediately (e.g., a lifecycle of a bus is +/- 7 years)
- 8. Exploring the potential contribution mobility on-demand services to address accessibility**
- 9. Highlighting the role of experts and stakeholders in the process**  
Inclusion of easily understandable and applicable accessibility requirements in tendering calls to support the clarification of technical solutions and associated costs. Decision-makers need sound multicriteria economic studies to make their choice.



## 5.4 Adopt user centric KPIs of accessibility

Collecting hard evidence and user insights on the end-to-end accessibility of transport infrastructure and services based on user criteria and prioritisation is a primary importance to take appropriate decisions. This evidence-based approach can help transport organisations focus their efforts and prioritise the funding of initiatives that can bring maximum gain in their cities and attract more customers to public transport.

To this end, the TRIPS project developed and deployed an accessibility auditing app<sup>36</sup> based on the Mobility Divide Index (MDI) which enables disabled passengers to assess their journey experience across several factors affecting accessibility, from planning to reaching one's destinations. These factors relate to:

1. **Autonomy:** the ability to travel independently, with no need for assistance
2. **Travel Time:** the whole time necessary to reach destinations including extra waiting, delays, or slowdown
3. **Comfort:** the easy access and use of the transport services, equipment, and facilities
4. **Safety:** the condition of not being exposed to unreasonable risks
5. **Convenience:** the condition of fitting in well with travellers' own needs and expectations
6. **Affordability:** the condition of not requiring additional expenses resulting in financial hardship.



Figure 6: The key dimensions of the MDI

A public website has been set up to visualise data that enables the transport ecosystem to take evidence-based decisions on accessibility, act as a platform to communicate their responses back to disabled passengers in a transparent fashion and monitor the impact on their decisions and accessibility initiatives over time.

<sup>36</sup> Links to MDI app: <https://play.google.com/store/apps/details?id=com.tbridge.trips&pli=1> (for Android users) or <https://apps.apple.com/us/app/trips-mdi/id1630779990> (iOs users).



## 6. Conclusions

This report collects the outcomes from WP7 and other WPs in one document. It describes the industry and policy recommendations for overcoming institutional challenges to adopting citizen-driven mobility innovations. It also outlines the steps that lead to further development, such as identifying the users' needs and implementing co-design methodology, and adoption of inclusive digital mobility innovations for all categories of public with a special attention to the vulnerable ones.

Here we described the lessons learned and the main outcomes of the TRIPS project, identified institutional and other challenges and recommendations for further research. It also includes policy and industry recommendations for inclusive transport initiatives at EU level and advices on their realisation, including concrete steps for transport operators and local authorities, transport service providers and organisations for users who face barriers in accessing transport.

In general, one of the main takeaways of the project is that there are many opportunities for collaboration with the users who have disabilities. Users with disabilities have ideas and the willingness to collaborate with transport and urban planners and engineers to co-design accessible solutions for making transport more accessible and inclusive. The designed and developed mobility solution designs and demonstrators, along with the business case for their further development became an asset of the local transport ecosystems and an example to imitate and learn from for other cities and regions.

This highlights that there is a lot space for ideas on future collaboration and further improvement when it comes to better accessibility in the public transport sector. The deployment of modern technologies and innovative ICT tools have brought significant spill-over effects to the public transport sector. The range of impact of such technologies' intake supports the cost-effectiveness of operations and maintenance tasks, provides a more agile planning and service planning, or enable a better interaction from the passenger perspective. Since the principal role of transport is to provide or improve access to different locations for individuals and businesses, focusing on the passengers with disabilities, their travel experiences, including enhancing safety and bridging their mobility gaps, can be highly improved.



## ANNEX 1: Methodology & Stakeholder Engagement

UITP engaged with many stakeholders and members organising various webinars and group discussions during the course of 2022 :

- Webinar “No passenger left behind: a Physical & Digital Barrier-Free Public Transport”
  - o 5 May 2022
  - o Presentation of 2 strategies from 2 cities, users analysis and development of methodology to map accessibility
  - o 4 speakers (2 operators, 1 user and 1 digital)
  - o Registration of 138 participants
  
- Webinar “No passenger left behind: a Physical & Digital Barrier-Free Public Transport: The relevance of accessible transport post-Covid”
  - o 10 May 2022
  - o 5 speakers (1 politician, 1 user, 1 transport representative, 1 digital and 1 co-design)
  - o Registration of around 50 participants
  
- On site event “Creation of digital tools to promote inclusive and accessible transport networks “
  - o 9 May 2022
  - o Onsite side-event at UITP IT-Trans event in Karlsruhe (Germany) (<https://www.it-trans.org/en/conference/conference-programme/>)
  - o Presentation of framework, user’s analysis and MDI tool
  - o Q&A with audience, including PT and digital/IT industry
  - o Around 50 participants
  
- Online Group discussion
  - o 5 May 2022
  - o Stakeholder engagement
  - o Online group discussion with the UITP Combined Mobility committee
  - o Presentation of TRIPS projects and group discussion on the current strategies and needs for strategy and inclusion in the urban mobility sector
  - o Comment and feedback on main actions and priorities to be undertaken by the sector focusing on taxi, ride hailing and combined mobility solutions
  - o Participation: 10 to 15 UITP members
  
- On-site event “Moving faster forward towards Accessible and Inclusive Public Transport for All”
  - o 12 July 2022
  - o High-level meeting at AAATE conference in Lecco
  - o Exchange of good practices and panel discussions
  - o <https://icchp-aaate.org/content/moving-faster-forward-towards-accessible-and-inclusive-public-transport-all-high-level>



- o Audience of 30/40 members participants
- On-site event “Co-designing mobility solutions in practice”
  - o During the Transport Research Arena (TRA) in Lisbon, 14 November 22  
Presentation of framework, main recommendations and pilot project in Lisbon
  - o [Meeting file accessible here](#)
  - o Audience of 50/60 participants
- Online Workshop with the UITP Diversity & Inclusion working group
  - o 20 October 2022
  - o Stakeholder engagement
  - o Online group discussion with the UITP Inclusion and Diversity WG
  - o Presentation of TRIPS projects and group discussion on the current strategies and needs for strategy and inclusion in the urban mobility sector
  - o Participation of 22 international members
- On-site group discussion
  - o 18 October 2022
  - o Stakeholder engagement
  - o Onsite group discussion with the UITP Marketing and Product Development members during the committee meeting in Vienna
  - o Presentation of TRIPS projects and group discussion on the current strategies and needs for strategy and inclusion in the urban mobility sector
  - o Comment and feedback on main actions and priorities to be undertaken by the sector
  - o Exchange of best practices including industry, marketing and communication experts
  - o Participation of 20 international members
- On-site group discussion
  - o 13 October 2022
  - o Stakeholder engagement
  - o Onsite group discussion with the UITP Metro Operation Sub-Committee ([Agenda](#))
  - o Presentation of TRIPS projects and group discussion on the current strategies and needs for strategy and inclusion in the urban mobility sector
  - o Comment and feedback on main actions and priorities to be undertaken by the sector
  - o Presentation of pilot project in Brussels
  - o Exchange of best practices including international networks (Japan, Brazil and India) focusing on the operations and management of large metro systems
  - o Participation of 25 international members ([List](#))
- Development of recommendations and main messages from the sectors
  - o From May until December 2022



- o Bilateral discussions with UITP members to understand and assess the wide range of strategies deployed to improve accessibility and create suitable products (e.g. Paris, Barcelona, private operators, etc.)

