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STRATEGY FOR ACCESSIBLE TRANSPORT IN THE DANUBE REGION

Smart Transport Network for the accessibility of Passengers with disabilities and reduced mobility in
the Danube Region through innovative services

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1. INTRODUCTION

Accessible transport is not merely a matter of convenience, but a fundamental right, enabling individuals with disabilities to exercise their freedom of movement and participate fully in society.

As the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) emphasizes, access to transport, along with accessible information and the built environment, is essential for people with disabilities to live independently and participate fully in all aspects of life.

The European Union has already developed several strategic documents to enhance accessible transport for all citizens, particularly focusing on individuals with disabilities and reduced mobility. Key initiatives include Sustainable and Smart Mobility Strategy (2020), Urban Mobility Framework, European Disability Strategy 2021-2030, Trans-European Transport Network (TEN-T).

These strategic documents collectively aim to create a more inclusive and accessible transport system across the European Union, ensuring that all citizens can benefit from seamless and independent travel and reflect the EU's commitment to creating a more inclusive and accessible transport environment for individuals with disabilities.

The European Union has made significant strides in promoting accessible transport through legislation such as the European Accessibility Act, the Web Accessibility Directive and passenger rights regulations for various modes of transport. However, challenges persist in the Danube Region, including inconsistent enforcement of accessibility standards, gaps in technical requirements for certain modes of transport, limitations in existing infrastructure, and ensuring information accessibility in various formats.

To address these challenges, DANOVA NEXT project prepared a strategy for accessible transport in the Danube Region. The strategy aims to highlight the current state of accessibility in the Danube Region, identifying strengths, gaps, and disparities, propose actionable measures to enhance accessibility, serve as a practical guide for policymakers, transport operators, and stakeholders to harmonize efforts and implement inclusive transport systems.

The structure of the document is designed to provide a comprehensive and actionable framework for enhancing accessibility across the Danube Region. The Introduction offers contextual information about the region, explains the strategy's purpose, and highlights key challenges and project activities. The Assessment of Needs examines the diverse accessibility requirements of disability groups and identifies gaps across different transport modes. Insights from Existing Solutions and Best Practices showcase replicable innovations, while the Assessment Methodology details the DANOVA NEXT framework for evaluating and prioritizing actions. Key strategic areas for enhancing accessibility outline strategic focus areas, and general measures for accessibility provide broad recommendations for improvement. Finally, the framework for innovation and advanced technologies introduces the DANOVA NEXT Toolkit, promoting advanced solutions for inclusive transport systems.

The DANOVA NEXT strategy builds upon the foundation of the previous DANOVA project and provides practical guidance for public transport providers to address the needs of individuals with all types of disabilities.

The recommendations presented in the strategy are derived from results of activities within the DANOVA NEXT project where various measures and ideas to make transportation facilities fully accessible have been collected. These were mainly joint discussions, brainstorming and transnational

working group meetings which included representatives of transport facilities, associations representing people with disabilities, local public authorities, experts from technical and innovation companies and scientists from universities and academic sector.

2. SITUATION OF ACCESSIBLE TRANSPORT IN THE DANUBE REGION

2.1. STRATEGIC DOCUMENTS ADDRESSING ACCESSIBLE TRANSPORT IN DANUBE REGION

The European Disability Strategy 2021-2030 sets out a comprehensive framework for promoting accessibility and inclusion for persons with disabilities across the EU. While it does not explicitly focus on the Danube Region, it provides guidelines and objectives that member states, including those in the Danube Region, can implement to improve PWD (Persons with Disabilities) accessibility. The strategy encourages efforts to enhance transport accessibility, support cross-border accessibility and implement the European Accessibility Act. While the strategy does not specifically mention the Danube, it provides a framework that can support accessibility enhancements in the region, fostering a more inclusive environment for individuals with disabilities across national boundaries.

The Interreg Danube Transnational Programme emphasizes inclusive growth and equal opportunities, with accessibility for persons with disabilities or reduced mobility (PRM) being a key priority. It fosters cooperation among countries in the Danube region to improve transport infrastructure and services, ensuring compliance with EU accessibility standards. The program supports initiatives to eliminate physical, digital, and systemic barriers in multimodal transport, promoting universal design principles and accessible mobility solutions. By integrating accessibility into policy-making, capacity building, and project implementation, the program strengthens regional cohesion and enhances the social and economic participation of persons with reduced mobility.

Data specific to PWD accessibility in the Danube Region is somewhat limited in centralized EU reports, as most data focuses on broader transport and infrastructure accessibility. However, certain studies and EU initiatives provide insights into accessibility conditions for PWD in Danube region such as ESPON Reports.

The ESPON-TRACC report primarily focuses on general transport accessibility in terms of geographic and economic accessibility, rather than specific accessibility needs for PWD, including those who are deaf or hard of hearing, blind or partially sighted. The report generally assesses infrastructure and transport networks based on distance, travel times, and network connectivity rather than accessibility features for people with disabilities or specific functional needs. The essential message of the ESPON-TRACC document is to highlight how transport accessibility varies across Europe, influencing economic opportunities, social inclusion, and regional development. By mapping these variations, the study provides insights that help policymakers understand where improvements in infrastructure or public transport services may be needed. The document emphasizes that transport accessibility is a key factor in achieving balanced regional development, as it affects the ability of citizens and businesses to connect to key services, markets, and employment opportunities.

The ESPON-TRACC project describes the accessibility of the Danube Region as varied, with considerable differences across countries and regions. Danube region, encompassing parts of Central and Eastern Europe, includes both highly accessible urban areas and remote, less accessible rural areas. Key insights on the Danube Region's accessibility are as follows:

1. Geographic and Socioeconomic Diversity: The Danube Region spans diverse terrains and socioeconomic conditions, from well-developed western parts to less-developed southeastern areas. Accessibility generally decreases moving southeast along the river, with the lower Danube areas (like parts of Romania and Bulgaria) facing more significant accessibility challenges.

2. Road and Rail Network: The western and central parts of the Danube Region, including cities like Vienna and Budapest, benefit from relatively well-developed road and rail networks that connect them to major European corridors. However, southeastern areas often lack sufficient infrastructure investment, leading to slower travel times and lower connectivity.

3. Cross-Border Connectivity: While the Danube itself serves as a natural corridor, cross-border connectivity remains uneven. Some border areas lack efficient transport links, impacting regional integration and economic cooperation.

4. Air Accessibility: Air travel accessibility varies, with better service and coverage in the region's western and more economically developed areas, while southeastern areas may lack direct flights to major EU hubs, making international access more limited.

5. Potential for Improvement: The ESPON-TRACC project suggests that improved infrastructure, especially for road and rail links, could significantly enhance the region's accessibility. Emphasis is placed on integrating the Danube Region more closely into the trans-European transport network to foster regional development and reduce economic disparities.

We can conclude that the Danube Region faces unique challenges regarding accessible transport due to its diverse geographical features, socio-economic disparities, and cross-border considerations. Many areas within the Danube Region are characterized by limited connectivity, particularly in rural and less developed regions which poses challenges for people with disabilities who may face difficulties accessing essential services, employment, and social activities. The region also faces demographic changes, including an aging population, which increases the demand for accessible transport options. The region's unique geographical features, diverse population, and role as a major transit corridor necessitate a comprehensive strategy that addresses the specific needs of people with disabilities.

2.2. SITUATION OF ACCESSIBLE TRANSPORT IN DANOVA NEXT PARTNER COUNTRIES

As revealed through the activities of the DANOVA NEXT project, the current state of accessibility in the participating countries, highlighting accessibility challenges in different modes of transportation for countries is as follows:

In air transport, Croatia has a satisfactory legislative framework, but gaps in implementation create challenges such as poor communication during disruptions, the lack of accessible waiting areas, and insufficient assistance for PWDs using mobility aids like electric wheelchairs. Hungary has accessibility regulations in place, but low awareness among both service providers and passengers limits their effectiveness. Infrastructure improvements, such as wider corridors and better tactile paths, along with enhanced staff training and better post-security assistance, are necessary. In Montenegro, accessibility laws mandate compliance, but enforcement is weak. Airports require improvements like accessible parking, better signage, and staff training in sign language, while awareness of accessibility needs remains low. Bosnia and Herzegovina has EU-aligned regulations that offer some support, but issues persist, including the need for staff trained in sign language and enhancements to infrastructure for the deaf and hard of hearing. Slovenia's air transport is generally accessible, though service quality varies by provider. Better communication methods for hearing-impaired passengers and disability etiquette training for staff are necessary. Austria's air travel is among the more accessible options, though inconsistent information dissemination and support services highlight areas for improvement.

In urban transport, Croatia faces significant gaps, particularly in smaller areas, with challenges such as inaccessible vehicles, lack of tactile paths, and insufficient staff training. Montenegro's urban areas are mostly non-compliant with accessibility laws, with common issues including the absence of ramps, elevators, and communication aids. In Bosnia and Herzegovina, urban transport infrastructure is inadequate, with poor announcements and a lack of visual aids for the hearing impaired. Slovenia exhibits inconsistent accessibility, with larger cities like Ljubljana performing better than rural areas. Common issues include poor sidewalk conditions and limited accessible taxis. Austria faces challenges such as overcrowded vehicles, inadequate acoustic signals, and outdated infrastructure, while regulatory exceptions limit service uniformity. No detailed data on urban transport was provided for Hungary.

Water transport emerges as the least accessible mode in Croatia, with limited infrastructure like wheelchair ramps and tactile guides. Ports and vessels urgently require upgrades. Montenegro's ports are poorly equipped, with inadequate facilities for disembarkation and a lack of necessary equipment. Austria's water transport is outdated and largely inaccessible, with significant gaps in vessel adaptations and port infrastructure. Specific data on water transport was not provided for Bosnia and Herzegovina, Slovenia, or Hungary.

Overall, accessibility in the Danube region remains inconsistent, with urban and water transport requiring the most significant improvements. Strengthened enforcement of accessibility laws, infrastructure upgrades, and comprehensive staff training are critical to creating an inclusive transportation system across the region.

More information on description of accessibility in each country and each mode of transport can be found in Appendix 1, where a detailed summary of accessibility challenges faced by persons with disabilities (PWDs) across different transport modes (air, urban, and water) in various countries is prepared based on the DANOVA NEXT result - deliverable D.1.1.4: Assessment feedback report which contains feedback collected from the target users through the local workshops and the online survey.

3. ASSESMENT OF NEEDS

The aim of this chapter is to identify and analyze the specific accessibility requirements of different disability groups, including people with vision, hearing, and mobility impairments. This chapter aims to present a detailed understanding of the gaps and barriers in the current transport systems across the Danube Region, structured by mode of transport. The findings serve as the foundation for prioritizing measures and interventions.

The Convention on the Rights of Persons with Disabilities and its Optional Protocol (CRPD, 2006, A/RES/61/106) defines persons with disabilities to "include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others".

In situations of forced displacement, persons with disabilities have the same rights and basic needs as others and face the same challenges. However, they face numerous additional barriers. They face particular protection risks, including a heightened risk of violence, exploitation and abuse, and high levels of stigma. They have difficulties accessing humanitarian assistance, education, livelihoods, health care and other services. They may be denied certain legal rights and are often excluded from decision-making processes and leadership opportunities.

Persons with disabilities are not a homogenous group. They face multiple and compounding forms of discrimination, on the basis of disability but also on other grounds, which may lead to situations of exclusion.

The World Health Organization estimates that about 16% of the world's population has a disability. In situations of forced displacement, the incidence of disability is usually higher because a larger proportion of persons have injuries, lack access to medical services, and face barriers in their environment.

This Strategy aims at improving accessibility of transport in the Danube region and addresses persons with visual impairments, hearing impairments and persons with reduced mobility.

3.1. VISION IMPAIRMENT AND ACCESSIBILITY

3.1.1. Definitions

According to the European Blind Union (EBU), the definitions and registration criteria of blindness and partial sight still vary from one European country to another.

The term „visually impaired“ is used to indicate blind plus partially sighted people together. Partially sighted and low vision are used as equal indication of limited sight.

To take both blind and partially sighted people equally into account in accessibility measures, it is essential to be aware of the distinctions within the target group.

Apart from people who have no visual perception due to blindness, there are many who, due to light and shade, different environmental conditions and physical and mental states, are still able to use what residual vision they have.

The extent to which a person can use his or her residual vision, e.g. for orientation, depends on various factors such as lighting and other environmental conditions, but also on the person's own physical and mental state during the day (fatigue, etc.). It is quite different from person to person, but also for one and the same person in the course of life and even one day. The boundaries are fluid. However, in relation to accessibility measures a clear distinction has to be made in order to consider all relevant requirements equally (see also EBU statement on the need to use the right definitions and terminology in standardisation work).

The latest figures on blindness and visual impairment show that 253 million people are affected worldwide. According to an article by the Vision Loss Expert Group in The Lancet magazine, there are 36 million blind people worldwide. A further 217 million live with severe to moderate forms of visual impairment. This means that a total of 253 million people worldwide live with some form of visual impairment, 89% of people with visual impairment live in low- or middle-income countries and 55% of those affected are women. These figures are from 2015 and are the most recent calculations available. The expert group also estimates that 1.1 billion people are nearsighted – meaning they can correct their visual impairment with glasses or contact lenses.

3.1.2. Requirements of visually impaired persons

In order to be able to act and move independently, visually impaired people have different requirements regarding services, products and design of environments.

It is therefore essential to apply „multi-sense principle“, which means two or more complementary senses , e.g. seeing and touching, seeing and hearing are available in a way that can be accessed.

Visually impaired people primarily use their (residual) vision. They need impressions and information that are clearly visible.

Blind people primarily use their sense of hearing and sense of touch. They depend on acoustic and tactile impressions and information.

To be accessible for the entire group of people with visual impairments, it is essential to ensure:

1. impressions and information in a clearly visible, audible or tactile form
2. visually contrasting guidance systems
3. perceptible signage and visual marking of potential hazards
4. good lighting
5. high-quality audio output

Another principle that should be applied to achieve accessibility for visually impaired people is to strive for some uniformity. This is a big challenge, especially when it comes to solutions implemented in different countries with different legislation and standards and different habits and abilities. However, it should at least be kept in mind when taking decisions, that being provided with familiar circumstances, solutions and technologies is a big benefit in relation to usability and accessibility. The pursuit of a certain uniformity should be a priority, especially for measures to be implemented across regions, as this can be the only way to ensure usability and accessibility that promotes the mobility of all people.

3.2. HEARING IMPAIRMENT AND ACCESSIBILITY

3.2.1. Definitions

Deaf and hard-of-hearing individuals represent a broad category within the larger group of those with sensory impairments, encompassing a wide range of accessibility requirements and needs to ensure full integration into society and personal independence. Generally, the term “hearing loss” is used to indicate that the person in question has a different situation than what we refer to as typical hearing; however, individual differences among these individuals can be quite significant.

Depending on factors such as the onset of hearing loss, the degree of auditory impairment, the existence of associated disabilities, knowledge of sign language, the educational institution attended etc., we can identify different categories of deaf or hard-of-hearing individuals, each with unique experiences and needs, contributing to remarkable inter-individual diversity.

According to the World Federation of the Deaf (WFD), “deaf” is a term that encompasses a range of hearing loss from mild to profound. Some individuals may rely entirely on visual communication, such as sign language, while others may use hearing aids or cochlear implants to improve auditory perception.

A common misconception is that all deaf individuals communicate solely through sign language. Many deaf individuals use a combination of lip reading, written communication, assistive listening devices, and sign language. Furthermore, “hard of hearing” individuals may face distinct challenges, as they rely partially on residual hearing and partially on visual cues for communication.

The extent to which a deaf or hard-of-hearing individual can navigate and interact within their environment depends on multiple factors, including environmental noise, the availability of visual aids, and their own communication preferences. Like vision impairment, hearing abilities and requirements can vary widely among individuals and may change over time due to age, fatigue, or medical conditions. Therefore, a clear distinction must be made between the needs of deaf individuals and those of hard-of-hearing individuals when designing accessibility measures.

Globally, it is estimated that over 400 million people have significant hearing loss or are completely deaf, with the number in Europe approaching 200 million. Those deaf persons who identify as part of the Deaf community typically use a sign language in their daily lives. Each country has one or more sign languages that become the „mother tongues” for these cultural and linguistic minorities. Although there is no certainty regarding the number of deaf individuals in Europe who know a sign language, global estimates from the World Health Organization indicate that approximately 70 million people worldwide use one of the more than 300 sign languages existing on Earth.

3.2.2. Requirements of deaf and hard of hearing persons

The accessibility needs of individuals with hearing impairments primarily relate to information accessibility, considering that physical integration is easily achieved for these individuals, but understanding and conveying messages presents significant vulnerabilities.

In general, deaf or hard-of-hearing individuals whose native language is a sign language face the highest risk of informational isolation and have specific needs for extended access to sign language interpretation and communication services. Conversely, access to written information is an absolute necessity for all other individuals who rely on reading and writing for continuous communication.

Members of Deaf communities also often benefit from these adaptations, though they will typically prefer information presented in sign language.

Communication and information accessibility for deaf individuals can therefore be achieved in various ways, tailored to each case. This ranges from providing sign language video versions of announcements and written materials, to ensuring access to remote or on-site interpretation services, subtitles, and closed captions for media content, as well as other technologies that make use of hearing aids (such as inductive loops). Accessibility for deaf individuals should extend beyond official, legal, or mandatory contexts to encompass everyday activities and cultural participation as well.

Lastly but very important, when it comes to safety, visual alarm systems (e.g. flashing lights) are essential for deaf individuals, enabling them to make quick and informed decisions in emergency situations.

Ensuring accessibility for deaf and hard-of-hearing individuals requires a broad, inclusive approach that goes beyond legal obligations. This means addressing their unique needs across all areas of daily life, allowing them to fully participate in society and enjoy cultural, educational, and social opportunities on equal footing.

To ensure accessibility for deaf and hard-of-hearing individuals, environments, products, and services must incorporate features that support non-auditory communication:

- Deaf individuals primarily rely on visual communication and require clear, highly visible signage, as well as visual alternatives for auditory information.
- Hard-of-hearing individuals benefit from visual aids but may also rely on technologies that amplify sound or reduce background noise.

The following principles should be applied to ensure accessibility for deaf and hard-of-hearing individuals:

1. The Principle of Visual Communication: All essential information should be provided visually, either through text, digital displays, or sign language interpretation.
2. The Principle of Alternative Formats: Auditory messages (e.g., announcements) should always be complemented by visual formats such as scrolling text or flashing light cues.
3. Standardization and Uniformity: Consistency in the use of visual aids and communication technologies across different countries, regions, and systems is crucial. Familiar solutions improve accessibility and usability, especially for those who frequently travel internationally.

3.3. MOBILITY IMPAIRMENT AND ACCESSIBILITY

3.3.1. Definitions

Persons with reduced mobility (PRM) include individuals who face challenges in moving due to a variety of physical, sensory, or neurological conditions. They experience various forms and degrees of impairment in movement and body positioning, or reduced function of specific body parts.

According to the International Transport Forum, this group is broadly defined and encompasses people who use wheelchairs, crutches, or other mobility aids, as well as those with motor disabilities affecting movement, balance, or endurance. Additionally, the target group includes individuals with conditions like paraplegia, tetraplegia, cerebral palsy, muscular dystrophy, multiple sclerosis, and those affected by strokes or chronic illnesses impacting mobility. PRM may also include older adults with age-related

mobility limitations and individuals with temporary injuries. The proportion of elderly people is increasing globally, with more than 46% of individuals over the age of 60 experiencing some form of mobility limitation due to chronic illnesses, injuries, or degenerative conditions.

Most common conditions of this target group:

Paraplegia - the result of a spinal injury in the thoracic, lumbar, or sacral regions of the spine, characterized by partial (paraparesis) or complete loss of function below the level of injury.

Tetraplegia - the result of a spinal injury in the cervical region of the spine, leading to complete or partial (tetraparesis) loss of function below the level of injury.

Amputations - the removal of a part of the body at a bone segment as a result of injury, (wartime) trauma, or illness, intended to prevent potentially much worse outcomes for the individual; the absence of one, two, three, or all four limbs.

Muscular dystrophy and other neuromuscular diseases - a group within numerous neurological disorders. The course of these diseases is progressive, with common signs and symptoms including muscle weakness, loss of muscle strength, and reduced muscle volume.

Cerebral palsy - a condition characterized by poor muscle control, stiffness (spasm), paralysis, and other neurological deficits resulting from brain damage occurring during pregnancy, at birth, or after birth, up to the age of five.

Multiple sclerosis - a chronic disease that affects the central nervous system (the brain, spinal cord, and optic nerves). The symptoms of MS are unpredictable and varied, such as visual disturbances, difficulty walking, sensory changes (e.g., tingling, prickling, numbness), weakness in limbs (e.g., one side of the body or both legs), limb stiffness, muscle spasms, balance disorders.

Reduced mobility encompasses a wide range of physical disabilities that limit an individual's ability to move, access services, or navigate their environment. Recognizing the diversity of this target group is essential for designing inclusive transportation measures.

According to the WHO's 190 million persons have significant difficulties in functional movement and 75 million persons need a wheelchair daily. This represents 1% of the world's population.

3.3.2. Requirements of persons with reduced mobility

Reduced mobility does not necessarily imply complete dependence. Many individuals with mobility impairments can move independently with adequate support, such as ramps, elevators, or accessible vehicles. However, barriers in the built environment, such as stairs, narrow doorways, or uneven surfaces, often limit their ability to do so. Therefore, accessibility measures must accommodate varying degrees of mobility and promote independence.

For independent and safe navigation of transport environments, persons with reduced mobility have specific requirements for services, products, and the built environment. Key elements include ease of access, spatial arrangements that avoid barriers, and equipment that supports independent travel. Also, available timetables should be provided digitally and at terminals to ensure PRM can easily access schedule information.

PRM require pathways and surfaces that are smooth, flat, and free from obstacles, with a minimum width to allow easy navigation for wheelchair users and individuals with mobility aids. Accessible walking paths, along with designated accessible counters, should be integrated throughout. Doors and entrances should be designed to allow unimpeded access, with ramps or accessible elevators available as alternatives to stairs. Entry points with automated doors or accessible handle placements are essential. Transportation facilities should offer designated seating and rest areas to accommodate PRM who need frequent breaks due to reduced endurance. Each mode of transport should include spaces designated for wheelchair users within accessible vehicles, with nearby accessible information buttons and support services as needed. PRM benefit from clearly marked routes and visually accessible signage. Signage should also provide directional information that is easily visible from seated and standing positions. Terminal connections for transfers should facilitate seamless movement between transportation options, and there should be specially adapted dial-a-ride vehicles that serve PRM who need customized transportation solutions. Facilities should have and implement protocols for offering transportation services to persons with disabilities. They should also provide wheelchairs, crutches, or other mobility aids as needed, along with assistance staff trained to support the specific needs of PRM. Establishing uniform standards for PRM accessibility across regions is essential for achieving seamless, barrier-free travel experiences. Standardization in infrastructure, assistance protocols, and signage will enable greater consistency and predictability, making transportation more accessible for all PRM.

To ensure accessibility for all PRM, it is crucial to implement the following:

- Step-free access throughout transport facilities
- Spacious pathways and seating arrangements
- Clear, accessible signage at all levels
- Enhanced support and assistance staff
- Facilities for assistance animals where needed

Therefore, following principles should be applied to achieve accessibility for PRM passengers:

1. The Principle of Universal Design: Environments and services should be designed to be usable by all individuals, regardless of their level of mobility, without requiring adaptations.
2. The Principle of Barrier-Free Design: Physical obstacles, such as steps, narrow passageways, and uneven surfaces, should be removed or mitigated wherever possible.
3. The Principle of Equal Usability: PRM passengers should be able to access services and facilities with the same ease and convenience as non-disabled passengers.

Consistency in design and implementation is vital to improve usability across different regions and systems. Uniform signage, infrastructure, and service protocols make transport facilities more user-friendly for PRM passengers.

3.4. SUMMARY OF PASSENGER ACCESSIBILITY NEEDS ASSESSMENT STRUCTURED BY MODE OF TRANSPORT AND DISABILITY TYPE

3.4.1. General accessibility needs for all target groups by mode of transport

Overall, there is a shared need for consistent accessibility across all transportation modes to enable independent travel for PWD. Staff awareness of PWD requirements, uniform design standards, and advanced technological solutions - such as user-friendly navigation and information applications - are crucial for improving travel experience. Public and staff education can foster an inclusive cultural shift

in how PWD are perceived and served in transportation contexts. Addressing accessibility gaps with practical infrastructure adjustments and reliable enforcement of legal standards will promote greater equality and independence for PWD in all transportation settings. By implementing these improvements across all transportation modes, services can better meet the varied needs of PWD, ultimately creating a more accessible and inclusive transport system.

The summary of accessibility needs and requirements for all target groups by mode of transport is presented below. The findings are based on the DANOVA NEXT survey results.

Air transport

Airports receive favorable reviews for certain services, but significant gaps remain, particularly for passengers with disabilities (PWD). Accessibility improvements should address structural elements like the height of counters and space at security checks. Widening airplane corridors and improving assistance services will enable more independent mobility for PWD. Visual information systems are necessary to support real-time communication for passengers, but technical malfunctions often limit effectiveness, impacting deaf or hard of hearing passengers who rely on visual notifications. For those with visual impairment tactile pavement markings and for blind passengers and those with reduced mobility barrier-free pathways are essential, as well as clear. Uniform staff training, particularly in communication and sign language, is vital for assisting passengers more sensitively and effectively. Educating both staff and PWD on available services could improve overall satisfaction.

Urban transport

In urban transport, accessibility improvements are critical, as satisfaction with current services is mixed. Enhanced communication systems - both visual and auditory announcements - are needed at bus/tram/railway stops and within vehicles to facilitate travel planning for all PWD. Technical delays and inconsistency in announcements contribute to lower satisfaction, especially for those dependent on clear, reliable information. The quality of infrastructure, including accessible sidewalks, tactile guide paths, and well-maintained bus/tram/railway stations, remains inadequate. Public transport staff must receive comprehensive training in PWD interaction and be encouraged to address passengers directly, promoting a more respectful and inclusive environment. Physical design improvements and consistent services across urban transportation would significantly enhance accessibility.

Water transport

Water transport, particularly for local island services, requires extensive improvements. Accessibility features such as elevators, expanded ramps, and tactile signage in both tactile and Braille formats are needed for safer boarding and navigation within passenger terminals. Consistent, clear announcements for delays and route changes are essential for deaf, hard of hearing, and visually impaired passengers. Maritime transport generally scores low on accessibility, underscoring the need for more robust infrastructural and service adaptations to support PWD.

3.4.2. Summary of accessibility needs assessment structured by disability type

Ensuring accessible transportation for all requires more than just legislative frameworks—it demands effective and practical implementation. Harmonizing accessibility features across services and locations,

coupled with stricter penalties for non-compliance, is essential to bridge existing gaps. Public awareness campaigns can foster a cultural shift toward inclusivity, while collaboration with Disabled Persons' Organizations (DPOs) in planning and evaluating services ensures that accessibility measures align with the real needs of users. By adopting these approaches, the Danube Region can move toward a truly inclusive and accessible transportation system for all.

The following sections detail specific recommendations tailored to the unique needs of each disability type, providing actionable insights to enhance accessibility for all passenger groups.

Blind and visually impaired individuals

Blind and visually impaired passengers face specific challenges in transportation facilities, primarily concerning navigation, access to information, and awareness of their surroundings.

- **Navigation and spatial orientation:** Tactile guide paths, continuous tactile markings, and structural cues are necessary for independent movement through transport hubs. Spaces should be designed with obstacle-free paths and visual contrast to aid those with low vision.
- **Accessible information:** Clear, accessible information through auditory announcements, Braille signage, and high-contrast visual displays is essential for communication about schedules, gate changes, and directions. Announcements should be regular and clear, addressing changes and updates in real time.
- **Safety measures:** Proper lighting, tactile warnings near hazards, and well-marked exits increase safety, while guide dog-friendly policies ensure independence for those relying on service animals.

Deaf and hard of hearing individuals

For deaf and hard-of-hearing passengers, clear visual communication is crucial, given the limited accessibility of auditory information.

- **Visual information systems:** Airports, bus terminals, and train stations should offer visual alternatives to auditory announcements, including screens with departure and arrival information, gate changes, and real-time delay updates. Visual signals, such as flashing lights for announcements or boarding calls, enhance awareness.
- **Staff training in sign language and communication techniques:** Basic sign language training and awareness of effective communication methods can greatly improve interactions with deaf passengers, allowing for smoother assistance and less reliance on written notes.
- **Assistive technology:** Accessible apps and notification systems can keep passengers informed about schedules, changes, or delays. Reliable visual signage, consistent across locations, ensures ease of travel.

Persons with reduced mobility

PRM passengers require facilities that support physical accessibility, comfort, and assistance.

- **Physical accessibility:** Barrier-free entrances, ramps, elevators, and wide corridors are crucial for independent movement. Adaptations such as accessible toilets, counters at varied heights, and seating designed for wheelchair users enhance convenience.

- Priority assistance services: From priority lanes to accessible transport vehicles, PRM benefit from dedicated assistance upon entering the transport hub. Clear and designated assistance points, with staff trained in accommodating mobility challenges, ensure passengers receive the necessary support.
- Accessible information and navigation tools: High-contrast signs at accessible heights and information systems with large fonts improve usability, while accessible apps with navigation features enhance self-reliance.

4. EXISTING SOLUTIONS AND BEST PRACTICES

The aim of this chapter is to showcase successful examples of accessibility measures and innovative solutions from within and outside the Danube Region. This chapter highlights replicable models, emphasizing the importance of leveraging proven practices to address the unique needs of passengers with disabilities and reduce implementation risks.

The accessibility of the environment and information for people with disabilities (PWD) is of paramount importance for their inclusion in society. Appropriate accessibility is often ensured through various solutions in transport terminals and elsewhere. Many of these solutions and measures can be transferred to other organisations facing similar problems.

To facilitate this transfer of workable solutions and provide a basic insight into the variety of measures that improve access to places and services for people with disabilities, a catalogue of existing solutions and good practises has been compiled. The DANOVA NEXT Updated catalogue is based on the work of the DANOVA project, which included best practises and solutions for visually impaired people. The DANOVA NEXT catalogue extends this work and adds best practises that facilitate access for people with hearing impairments and people with reduced mobility.

Building on DANOVA, the joint methodology for identifying assistive technologies, environments and infrastructures, approaches, strategies and standards in the field of accessibility for the visually impaired was extended to include solutions for people with hearing impairments and people with reduced mobility. The extended methodology was used by all partners of the DANOVA NEXT project, who contributed best practises and examples of innovative and/or useful solutions. These were then reviewed and selected cases were published in the updated DANOVA NEXT catalogue. Within the catalogue, the cases are divided into different categories, all of which are explained in the vocabulary to facilitate the use of the document. For each case, information is also provided on the involvement of impaired persons, the long-term sustainability of the case and contact information.



<https://interreg-danube.eu/storage/media/01JCZR1JP0YF6V1WBEYRZFKT80.pdf>

Figure 1: DANOVA NEXT Updated catalogue of best practices

The Catalogue contains 71 cases, all of which are applicable to transport facilities. In the following subsections an overview of the cases in various categories can be found.

4.1. ACCESSIBILITY POLICIES AND SERVICE STANDARDS

Policies, standards and codes of conduct can create barriers for passengers with disabilities, but they can also help to remove them. An organisation's accessibility policies should create a shared

understanding of why accessibility is important and how it fits into the organisation's framework or vision and core values. Service standards and procedures set clear expectations and lead to a better travel experience for passengers with disabilities when they are tailored to the needs of passengers with disabilities.

Service standards for passengers with disabilities should implement the general principles of non-discrimination, providing the assistance necessary for safe and independent travel, ensuring clear and effective communication and providing information in accessible formats, and ensuring that passengers with disabilities are always treated with respect and dignity.

Examples in catalogue include bylaw on ensuring the accessibility of buildings for people with disabilities and the establishment and operational standards for PRM service at airport (see Figure 2).

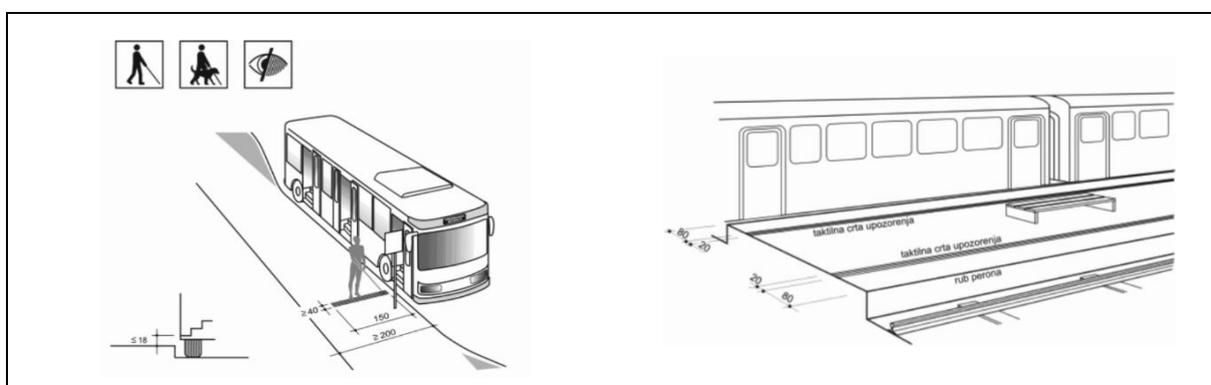


Figure 2: Visual representation of accessibility from Croatian by-law

4.2. CUSTOMER SERVICE AND DISABILITY AWARENESS STAFF TRAINING

Excellent customer service for passengers with disabilities is a matter of fundamental human rights and dignity, while contributing to the creation of a more inclusive and equitable society. Customer service is closely linked to staff training so that transport staff are aware of the needs of passengers with disabilities and can respond appropriately to their needs. One of the most effective ways to achieve this is to implement an appropriate training programme that helps staff to develop a better understanding of the different needs and challenges of passengers with disabilities, equips staff with the skills to communicate clearly and respectfully with passengers who have different communication needs, and ensures the safety of passengers with disabilities. Well-trained staff can create a positive and inclusive travelling experience for passengers with disabilities.

Examples of good practise include customer services that offer guided tours of public transport vehicles for the visually impaired (see Figure 3), a manual on the use of public transport for passengers with mobility impairments, assistance at public transport ticket machines, direct communication with the driver via the intercom on public transport and information desks that offer live assistance in various forms (sign language, voice information, etc.). Several examples of staff training are also included.



Figure 3: Know your vehicle - guided tour of public transport vehicle in Slovakia

4.3. FACILITIES FOR GUIDE-DOGS AND SERVICE ANIMALS

For more than 100 years, people with disabilities have relied on animals to help them live and travel independently. Although these animals help passengers in different ways, they also have their own needs. Large transport terminals, especially airports, are required to set up service animal areas where passengers with disabilities can allow their animals to relieve themselves. Cases include indoor restroom facilities for several guide dogs at a time when they need to be indoors for extended periods of time, as well as a public dog park as part of an international airport.

4.4. MULTISENSORY GUIDANCE AND INTERACTIVE MAPS

It is often difficult for people with disabilities to find their way around unfamiliar environments. This is all the more true for transport terminals, which can be crowded and overwhelming. In general, transport facilities should be designed, built and managed to facilitate orientation. Orientation includes finding your way, avoiding obstacles that could pose a hazard and knowing when you have reached your destination. To address these challenges, a multi-sensory approach to guidance and mapping should be implemented. Appropriate visual, auditory and tactile information should be provided to facilitate orientation and wayfinding. Visual orientation aids, signage and tactile information, such as a change of material or tactile walking surface indicators (TWSIs), should be provided at key decision points to facilitate orientation and wayfinding.

Acoustic: Acoustic guidance systems provide real-time acoustic indications of obstacles, landmarks and potential hazards. Acoustic guidance systems include acoustic announcements and feedback that help with tasks such as crossing roads, finding specific locations and avoiding collisions, recognising obstacles in the way and warning of potential hazards such as oncoming traffic, uneven surfaces or construction sites.

Examples include visual electronic information boards at bus stops that are equipped with a loudspeaker and can be activated by remote control, orientation beacons that provide acoustic signals or voice information when activated (see Figure 4), audio maps and verbal descriptions of transport terminals, differentiated acoustic signals for traffic lights at pedestrian crossings and automatic adjustment of the volume to the noise level in the surrounding area, as well as acoustic announcements at airports, on buses and trams.



Figure 4: Electronic information board at stops equipped with acoustic announcements

Tactile: Tactile surfaces and markings provide essential cues to individuals with visual impairments to move around confidently and independently. These include tactile paving and textured flooring, braille signage as well as tactile indicators or relief graphics on controls, machines or other objects. Several cases include use of indoor and outdoor tactile walking surface indicators (TWSIs) (see Figure 5).



Figure 5: Indoor tactile guidance at Dubrovnik airport

Visual: Accessible visual guidance and signage means using appropriate colours and contrasts, large and legible fonts, appropriate placement of visual elements (pictograms) and appropriate lighting.

The best examples include contrasting guidance on the wall, indoor bus timetable display with optimised visual features and placement of information (see Figure 6), printed bus timetables in large font to increase legibility and display boards with information on the accessibility of means of transport.



Figure 6: Indoor bus timetable display with optimised visual features in Maribor bus station

Braille: is a tactile writing system used by visually impaired people in which raised dots represent the letters of the alphabet. It can be read either on embossed paper or with the help of refreshable Braille displays connected to computers and smartphones. Examples include Braille lettering on doors and lift control panels in terminals, (see Figure 7) self-adhesive Braille labels and the translation configurator, which automatically translates content into Braille and creates the corresponding 3D models for 3D printing in aluminium or other materials. This enables the printing of Braille signs (handrails, etc.) that can be used at all transport terminals.



Figure 7: Braille signage in Port of Kotor

Multisensory and interactive maps: combine tactile, auditory and visual elements to create a multisensory experience that helps users better understand and navigate their environment. They can include tactile elements such as raised surfaces, textures and Braille labels that provide tactile information about the content of the map. Maps can feature audio descriptions, sound effects and spoken directions, while interactive features such as touchscreens, buttons and other interactive elements can also be used. Examples include tactile orientation maps of airports (see Figure 8), ports and tactile city maps, as well as a simplified map of a bus station and a map with accessible information about an entire city.

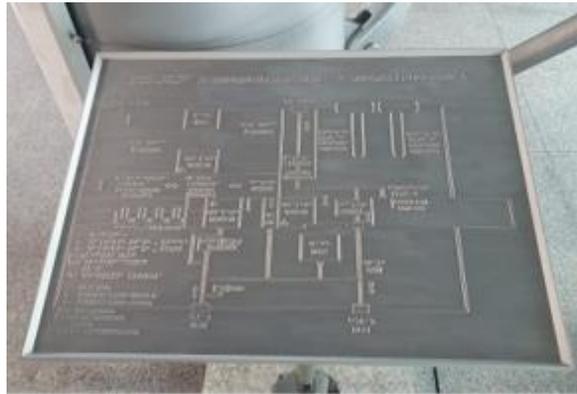


Figure 8: Tactile orientation plan of Podgorica airport

4.5. PERSONALIZED ASSISTIVE TECHNOLOGIES, SMART PHONE APPS AND COMMUNITY SERVICES

Personalised assistive technologies are devices or systems that are tailored to the specific needs and preferences of a person with a disability. Unlike general assistive technologies, personalised technologies are tailored to the user's unique challenges and abilities and maximise their independence and quality of life. Smartphones and smartphone apps are often used as assistive devices or to provide a specialised service to people with disabilities. Often these services are supported by a community service where volunteers provide some form of support to people who need help.

Examples listed in the catalogue include variety of smart-phone apps for navigation and guidance of people with disabilities, indoor navigation using specialized beacons, orientation and navigations maps etc. Furthermore, the catalogue includes examples of smart-phone apps paired with community service providing audio guidance to visually impaired and interpretations to and from sign language (see Figure 9).



Figure 9: Voices for hands - video remote interpreting

4.6. WAITING AREAS, DEPARTURE/ARRIVAL POINTS AND SANITARY FACILITIES

This includes solutions for platforms, gates, queues as well as solutions for waiting areas in airports, ports and train/bus stations. Examples include the certification of bus stops and coaches for barrier-free access, the remodelling of bus stops to make them accessible, a calling point in the hall of an airport terminal equipped with an accessible intercom so that people with disabilities can receive assistance at

any time, and sanitary facilities designed and equipped so that most people can use the facilities without assistance (see Figure 10).



Figure 10: Sanitary facilities in airport Podgorica

4.7. MISCELLANEOUS

The DANOVA NEXT catalogue of good practises also contains other various examples of best practices for passengers with disabilities, ranging from solutions for vehicle equipment (inclusive doors for passengers with mobility impairments, safety bars for wheelchairs – see Figure 11), special vehicles or services for people with disabilities (taxi, dial-a-ride public services) to information on transport in accessible formats or information on barrier-free transport or accessibility of public spaces and cooperation with stakeholders (Disability Council).



Figure 11: Safety bar for wheelchairs Innsbruck Verkehrsbetriebe

During the Transnational Working Group (TWG) meetings, participants collaborated to develop an evaluation matrix with specific criteria to rank the solutions presented in the Catalogue of Best Practices. This structured ranking provides final users, such as decision-makers and stakeholders, with clear guidance to better understand and prioritize the most effective solutions for accessibility in transportation facilities. See Appendix 2: Catalogue of best practices – solutions ranking.

5. ASSESSMENT OF ACCESSIBILITY OF ALL PASSENGERS

The aim of this chapter is to present the outcomes of the DANOVA NEXT accessibility assessment, focusing on the efficiency and gaps in transport facilities for blind/partially sighted, deaf/hard of hearing, and PRM passengers. This chapter provides an evidence-based evaluation methodology and prioritization framework for identifying critical areas of intervention.

5.1. DANOVA NEXT ASSESSMENT METHODOLOGY

DANOVA NEXT aims to improve the accessibility of airports, seaports, train stations and bus terminals for disabled persons by developing a range of new services and skills to enable full access to all transport information, facilities, and services. The project focuses on the following groups of passengers potentially affected by existing barriers to mobility:

- blind and partially sighted persons (visual impairments),
- deaf or hard of hearing persons (hearing impairments),
- persons with reduced mobility (physical impairments).

The goal of DANOVA NEXT is to improve the accessibility of existing public transport terminals for disabled passengers. Therefore, the assessment is organized in modules to assess the current level of accessibility of each participating mode of transport to identify deficiencies as well as examples of best practices that could be implemented elsewhere. A common assessment methodology has been developed to evaluate the accessibility of different transport terminals, from airports and ports to train and bus stations, from large terminals to smaller ones. The methodology not only addresses the physical accessibility of each transport terminal, but also aims to verify the policies and standards of each assessed site, as well as compliance with national regulations. Thus, the methodology consists of three main segments:

1. Review of the national environment (regulations)
2. Off-site assessment (access to information and rules of conduct)
3. On-site assessment (built environment assessment)

The methodology begins with a review of national regulations that set minimum or required standards for accessibility. National regulations vary from country to country, and this is reflected in the current state of transport terminals – what is required in one country is not necessarily required in another. Therefore, national regulations need to be reviewed, and the implementation of these regulations needs to be checked.

The off-site assessment of the transportation terminal consists of two modules: ‘Site policies, service standards and awareness training’ and ‘Pre- and post-travel access to information’. It will review and evaluate the site’s disability awareness policies, standards, and training. Access to information will also be reviewed as part of the off-site assessment. This includes access to information about the transportation terminal before and after the trip, such as websites, apps, phone services, and the availability of personalized assistive technologies.

In the framework of the on-site assessment, the built environment is assessed (the building(s) themselves). This assessment follows the transport chain that follows the physical movement of passengers through the terminal, whether they are departing or arriving (approaching/ moving through

the terminal/leaving the terminal). This movement is further divided into modules (based on travel segments) to be evaluated.

The Off-site assessment consists of two modules 'Site policies, service standards and awareness training' and 'Pre- and post-travel access to information', which divide into seven different items related to the access to information and rules of conduct:

- Website
- Disability awareness training
- Smartphone app
- Customer service standards
- Accessibility policy
- Telephone services
- Personalized assistive technologies.

For the On-Site assessment of DANOVA NEXT there are eleven additional modules:

- Approach and departure to and from the site
- Entrance to the site
- Inside circulation
- Security screening and customs
- Sanitary facilities
- Shopping and catering facilities
- Waiting areas
- Departure point(s)
- Arrival point(s)
- Evacuation routes

Each of these modules use the DANOVA building blocks:

- Parking car
- Parking taxi
- Bus stops
- Tram stops
- Train stops
- Signs Displays
- Paths, corridors
- Travellators/ Passenger conveyors
- Doors
- Stairs
- Ramps
- Lifts
- Escalators
- Counters
- Machines
- Toilets
- Service animal relief
- Evacuation route

In the context of DANOVA NEXT the following modules have been added to cater for the needs of the new groups of passengers:

- Announcements
- Visual Information System
- One to one communication

DANOVA NEXT modules are custom-built according to specifics of each terminal. The relationship between DANOVA NEXT building blocks and DANOVA modules is shown in the figure below (see Figure 12).

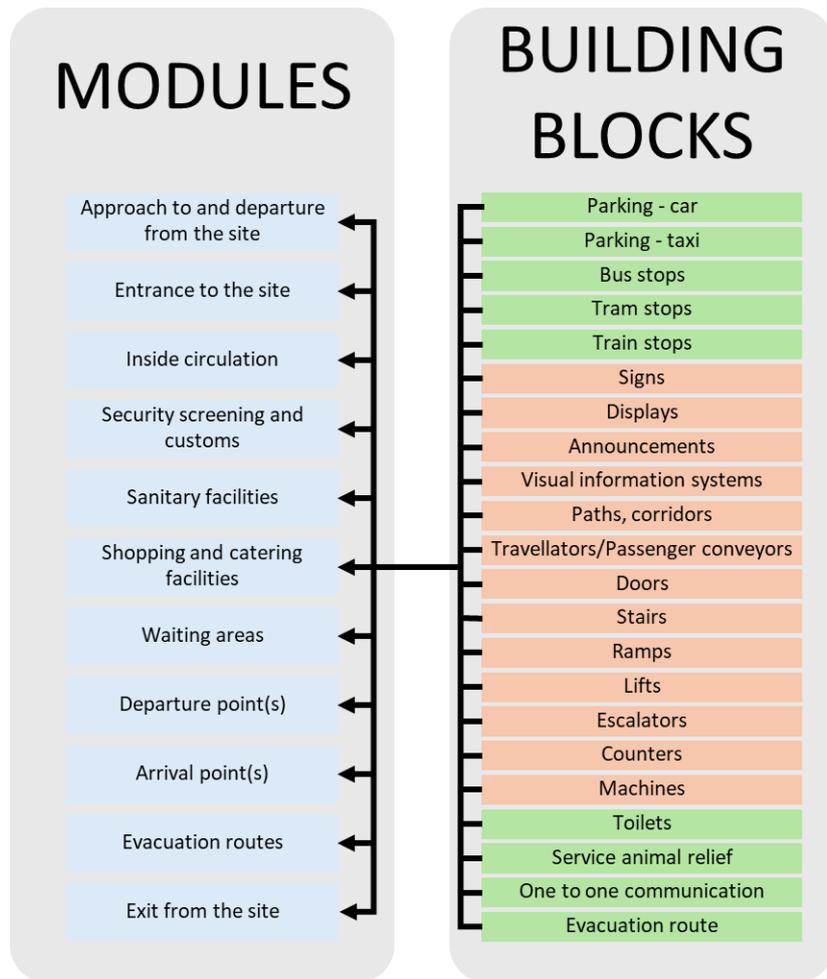


Figure 12. Relationship between DANOVA NEXT modules and building blocks

5.1.1. Assessment process

A dedicated team is required to do the assessment of the accessibility of a transport terminal in a multistep process (see Figure 13). The process starts with in-depth understanding of the DANOVA Assessment methodology.

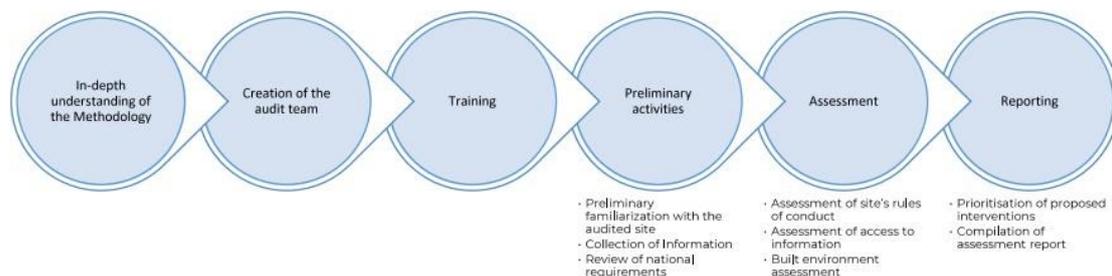


Figure 13: DANOVA NEXT assessment process

According to the methodology, an audit team should consist of at least two members, ideally at least four:

- Representative of the transport terminal
- Expert in the field of accessibility for visual, hearing and/or physical impairments
- Representative of persons of the respective impairment groups.

The next step in the process is the familiarization of the team with the transportation terminal being assessed. Initial site visits need to take place to allow audit team members to gain a basic understanding of the site being audited. The process continues with the collection of information on national regulations and standards, rules of conduct (policies, standards, information about staff training), and information sources (webpage, apps, information/telephone services). Once all data are collected, a review of national requirements takes place. In this phase, the team members should be familiarized with the national regulations and standards. If this is not the case, it will be impossible to assess the site's compliance in later phases. At this stage, the actual assessment begins with an evaluation of the site's code of conduct covering three different aspects - accessibility policies, customer service standards, and disability awareness trainings. To obtain this information, interviews with terminal managers need to be conducted.

In parallel, an assessment of access to information takes place. There are four elements to be considered website, dedicated smartphone app (if available), telephone services and possibility of personalized assistive technology use. The audit team also checks whether the site offers information (and reservation of special services for people with disabilities, if applicable) via the phone and whether personal assistive technologies are available or can be used at the transport terminal.

The assessment of the built environment is the central part of the audit. All areas of the transport terminal accessible to passengers are inspected, including restricted areas of airports and ports (passenger areas behind security checkpoints).

Once all three main segments have been evaluated, the evaluation report is prepared. Based on the findings, audit teams draw up recommendations on how to improve the accessibility of the terminal. Recommendations are given in the form of a proposal for interventions ranked from most to least urgent. The audit team compiles a report containing a brief presentation of the transportation terminal, recommendations in the form of prioritization of interventions, and an evaluation grid (all tables used for the evaluation). The central part of the report is the prioritization of the interventions to be used by the transportation terminal manager for the creation of an action plan for improving the accessibility of the terminal.

5.1.2. Assessment criteria

To facilitate implementation, understanding of the report, and prioritization of actions, rating system will be used to evaluate each element with evaluation criteria. The evaluation criteria are as follows:

1. Hazardous, inaccessible, and unsatisfactory
 If the evaluated element is dangerous and poses a hazard to disabled persons, and if the rated element is inaccessible, and if it is rated unsatisfactory by disabled persons, the element receives the lowest rank (1) and is given the highest priority for intervention. Note that all three conditions must be met in order to assign the lowest rank 1.
2. Inaccessible and unsatisfactory
 If the rated element is inaccessible and assessed as unsatisfactory by disabled persons but does not pose a hazard to passengers with impairments in questions, the element is rated with rank 2.
3. Unsatisfactory but acceptable
 The element is rated unsatisfactory by disabled persons but does not pose a hazard to passengers with impairments in question, nor is the element inaccessible. The element is evaluated with rank 3.
4. Accessible and acceptable
 The element is rated as acceptable and accessible to disabled persons; the element is rated with rank 4.
5. Accepted as a Best Practice
 The element is rated as acceptable and accessible to disabled persons and shows a very exemplary way of implementing standards. It is very important that the element is rated as exemplary by the expert or representative(s) of the passenger groups mentioned in the previous section. It is very important that the element works for the intended user(s) - if the solution is very innovative but does not work for disabled people (e.g. due to its complexity), it cannot be given the highest rank. The solution is something that works and can/should be transferred and implemented elsewhere; the element is evaluated with rank 5.

All elements rated 1 are assigned highest priority for intervention, followed by elements rated 2. The fully accessible transport terminal (airport, port, train/tram and bus station) cannot have elements rated 1 or 2, all ranks must be 3 or higher. The rating system is shown in the table on the following page.

Table 1. Assessment rating system

Evaluation rank	Evaluation Criteria	Symbol	Priority for intervention
1	Hazardous, Inaccessible and Unsatisfactory		Highest
2	Inaccessible and Unsatisfactory		High
3	Unsatisfactory but acceptable		Moderate

4	Accessible and Acceptable		Low
5	Accepted as a Best Practice		None

5.1.3. Prioritization of interventions

As already mentioned, the prioritization of interventions is the main part of the assessment report. Based on the assessment grid, interventions are proposed for all elements: 1. ranked with 1 (Hazardous, Inaccessible and Unsatisfactory), 2. ranked with 2 (Inaccessible and Unsatisfactory), 3. ranked with 3 (Unsatisfactory but acceptable). Interventions proposed for elements ranked with 1 (posing a danger to passengers) are given the highest priority, interventions proposed for elements ranked with 2 are given medium priority, and interventions proposed for elements ranked with 3 are given low priority. If the assessment does not include items rated 1, 2, and 3, the transportation terminal is rated as fully accessible to persons who are blind and partially sighted. The main outcome of the assessment is a list of proposed interventions grouped by priority. The interventions are ranked from most to least urgent which should make it easier to prepare an action plan for improvement of the assessed site. The list of interventions proposed within the audit is aimed at site managers to improve the assessed terminal.

5.2. DANOVA NEXT ASSESSMENT METHODOLOGY IN PRACTICE

The assessment of the accessibility to passengers with disabilities was performed at eleven transportation terminals consisting of:

- Airports
 - Budapest (HU)
 - Chisinau (MD)
 - Dubrovnik (HR)
 - Podgorica (ME)
 - Prague (CZ)
 - Sarajevo (BA)
 - Varna (BG)
- Ports
 - Kotor (ME)
 - Pula (HR)
- Public transport systems
 - Bratislava (SK)
 - Maribor (SI)

5.2.1. Assessment outcomes

The main outcomes of the assessment of the accessibility for people with disabilities were recommendations for improvements. Each site gave a list of interventions to base the

recommendations. For the presented sites, 246 interventions were identified and proposed. Most interventions focus on the built environment (see Figure 14).

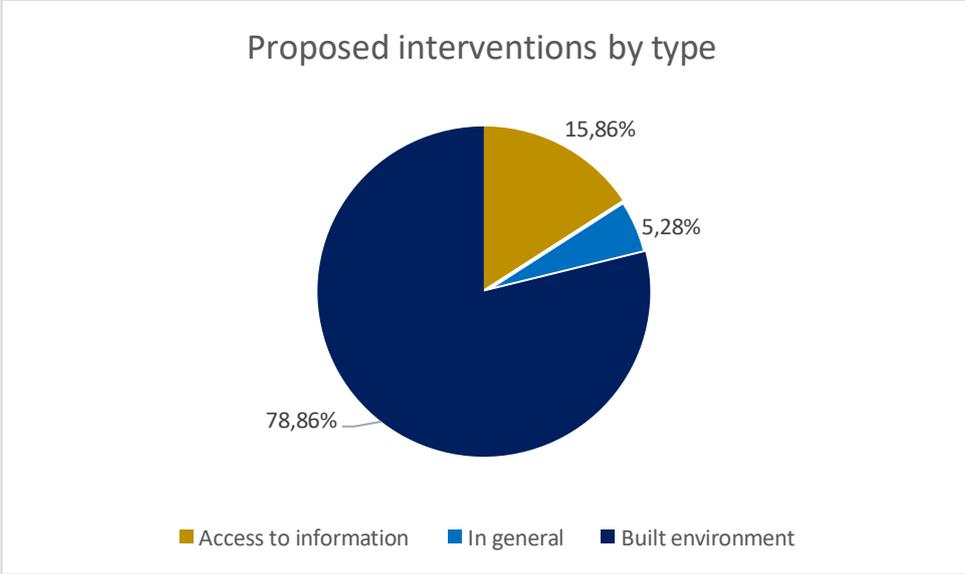


Figure 14: Proposed interventions by type

Out of these 246 interventions, 99 were considered as the highest priority, 65 are of medium priority and 82 were rated as low priority. A more detailed insight is shown in the figure below (see Figure 15).

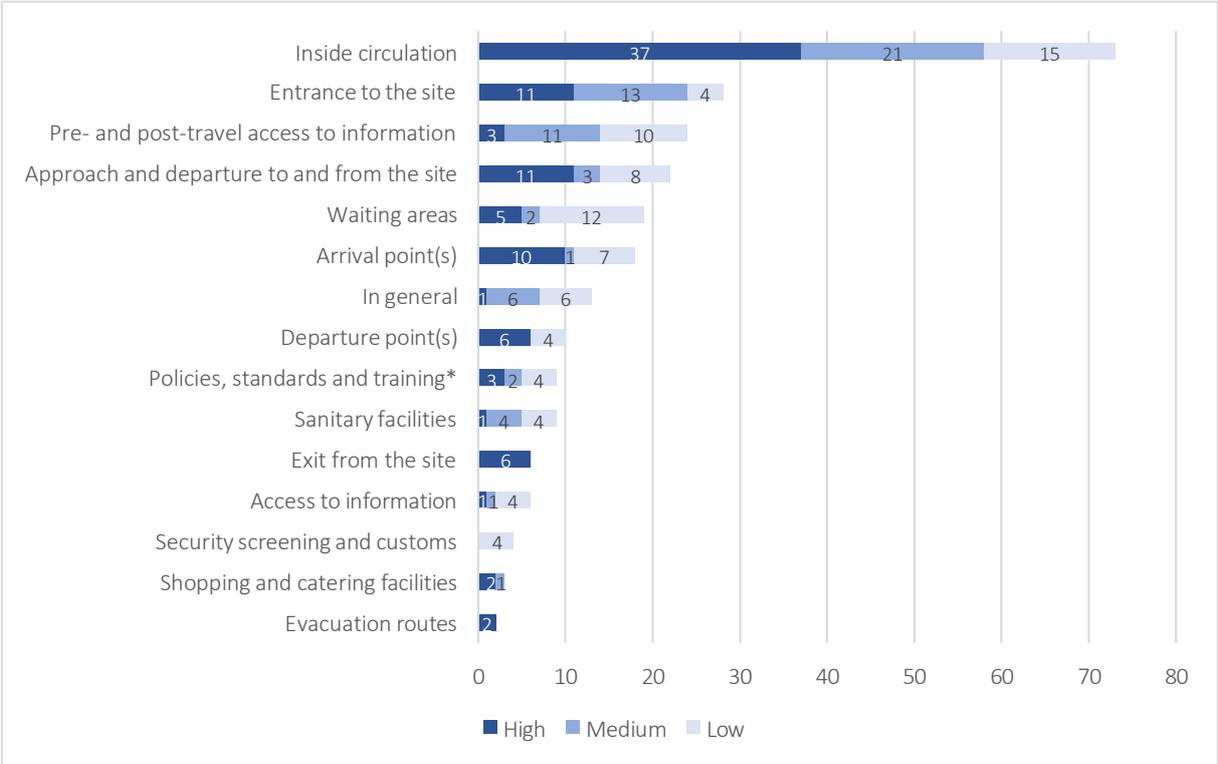
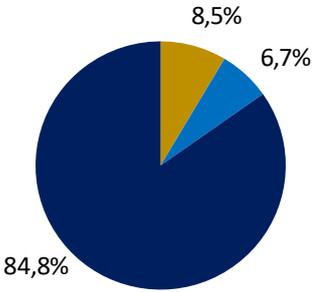
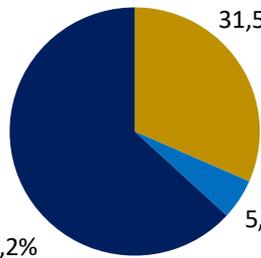
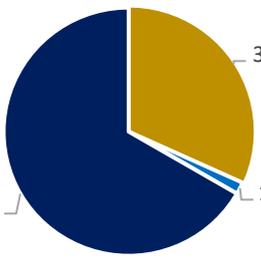


Figure 15: Prioritization of interventions per DANOVA NEXT module (*Site policies, service standards and awareness training)

For airports and seaport, the proposed interventions show a lot of similarities. Among many others proposals can be summarized as digital accessibility, accessibility policies and customer service standards, installation of TWSI's in critical areas, PRM security checks, PRM calling points renewal, "Bind Maps application extention", process and policy audit, policies on accessibility, induction loop systems for hard of hearing persons, outdoor TWSIs, visual directional signs, live assistance available at the counter to guide persons to their destination or alerting system both visual and audible. All these measures are applicable to different modules and building blocks.

Table 2: Proposed interventions per terminal type

Airports	Seaports	Public Transportation Systems																								
 <table border="1"> <tr><th>Category</th><th>Percentage</th></tr> <tr><td>Built environment</td><td>84,8%</td></tr> <tr><td>Access to information</td><td>8,5%</td></tr> <tr><td>In general</td><td>6,7%</td></tr> </table>	Category	Percentage	Built environment	84,8%	Access to information	8,5%	In general	6,7%	 <table border="1"> <tr><th>Category</th><th>Percentage</th></tr> <tr><td>Built environment</td><td>63,2%</td></tr> <tr><td>Access to information</td><td>31,5%</td></tr> <tr><td>In general</td><td>5,3%</td></tr> </table>	Category	Percentage	Built environment	63,2%	Access to information	31,5%	In general	5,3%	 <table border="1"> <tr><th>Category</th><th>Percentage</th></tr> <tr><td>Built environment</td><td>66,7%</td></tr> <tr><td>Access to information</td><td>31,7%</td></tr> <tr><td>In general</td><td>1,6%</td></tr> </table>	Category	Percentage	Built environment	66,7%	Access to information	31,7%	In general	1,6%
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Access to information	31,7%																									
In general	1,6%																									
<p>High priority interventions:</p> <ul style="list-style-type: none"> • Implement of assistive technologies • Improve of tactile guidance systems • Improvement of visual signage/illumination • Providing accessible infrastructure outside of terminals • Improve support service availability • Improve availability of PRM equipment 	<p>High priority interventions:</p> <ul style="list-style-type: none"> • Ensure accessibility policies and staff training • Improve accessible information on website • Improve guidance for visually Impaired • Introduce assistive technology (induction loop) • Improve visual and audio information systems 	<p>High priority interventions:</p> <ul style="list-style-type: none"> • Introduce accessibility policies and standards • Improve customer service availability • Introduce assistive technology (induction loop) • Improve tactile and visual guidance 																								

Based on interventions proposed for seven audited airports, it might be safe to state that aviation legislation and international industry standards play a role in the accessibility of airports to persons with impairments. This cannot be stated for seaports and urban public transport systems because there is

not enough data only two seaports and segments of two public transport systems were analysed. It must be pointed out that the results described in this report reflect the situation in analysed terminals only and cannot be understood as representative of the whole Danube area.

5.2.2. Experiences from assessed sites

Audit teams, which were specifically established to implement the DANOVA methodology did the assessment process at the different audited infrastructure sites at airports, ports and public transport systems. These teams were setup in 2024, and the audits were carried out in summer and early fall 2024. The teams consist of a mix of different experts such as terminal service experts, PRM specialists, sustainability specialists, people with impairments such as low vision, mobility experts, strategic planning, coordination and communication project managers or technical experts. The expert teams were of different sizes ranging between two and five people per audit team.

All teams began their assessment with an initial familiarization with the site and preparation of assessment tables. Different form of the audits was chosen which included workshops, interviews with managers and other staff took place, followed by on-site visits. The on-site part of the audit was typically completed in one or two days.

The assessment of the sites led to the following broad areas of recommended or also initiated actions:

- Enhance signage and visuals
- Infrastructure modifications: avoid glass walls, improve accessibility of ticket machines, cashiers especially outside the terminal
- Availability of service and technology
- Enhanced training and preparedness of staff, especially for deaf and hard-of-hearing persons
- Availability of equipment, e.g. reduce shortage of wheelchairs
- Introduce pilots and modification plans
- Scoring for the assessment is highly subjective => criteria must be harmonized on international level
- Standardized and unified design and signage standards are required to also enhance passenger experience.

6. GENERAL MEASURES FOR ACCESSIBILITY

During the Transnational Working Group (TWG) meetings, stakeholders collaboratively developed a comprehensive list of general measures aimed at improving the accessibility of transportation facilities for passengers with disabilities. These measures encompass solutions that address the diverse needs of passengers, including those who are blind, deaf, hard-of-hearing, or have reduced mobility. By categorizing measures into key areas, this list provides a structured framework for identifying and implementing practical solutions across various aspects of the transport system.

The general measures cover a wide range of areas, including the physical environment, accessibility of information, digital tools, customer service and training, special facilities, public transport accessibility, and other relevant considerations. Each category highlights actionable items that contribute to creating inclusive transport systems.

For example, the physical environment category emphasizes structural modifications such as tactile walking surface indicators, ramps, and accessible counters to enhance navigation and usability. The accessibility of information section focuses on ensuring that passengers receive information in formats that are readable, audible, or tactile, depending on their needs. Similarly, the digital tools category highlights the importance of inclusive technology, such as navigation apps, smart glasses, and accessible websites, to promote independence and convenience for all passengers.

Additionally, the list underscores the importance of customer service and training, advocating for regular staff training on PRM awareness, first aid, and soft skills to ensure high-quality interactions with passengers. Other categories, such as special facilities and public transport accessibility, address specific needs like sensory rooms, service animal areas, barrier-free stops, and onboard accessibility features.

This general list of measures serves as a practical resource for decision-makers and stakeholders, offering a foundation for developing comprehensive strategies that align with the principles of universal design and meet the requirements of passengers with various disabilities.

Table 3: General list of measures for accessibility

1. Physical environment	
	tactile walking surface indicators
	tactile orientation plans for blinds
	signage (braille), contrasting markings
	ramps, elevators for easy access
	special lanes (mainly used at airports)
	removal of existing barriers
	zones with induction loops (for hardly hearing)
	accessible counters (e.g. lowered counters at check-in)
	proper dimension of entry door (for wheelchairs)
	direction of door opening
	alternative option to touch screens (braille sign can be only on physical buttons)
	resting places - benches (60m distance in Romania)
	dedicated lanes for PRM passengers
	fire evacuation special chairs
2. Accessibility of information	
	provision of information in readable formats
	digital accessible formats (panels, websites)

website (content, structure, ...); user-friendly websites
displays providing actual information (+ in different language)
visible information (proper font size, ...) for partially sighted, for blind (in braille letters)
acoustic information (in public transport - in stations and in vehicles)
induction zones (induction hearing loops)
alternatives to touch screens (braille signage)
physical information desk
3. Digital tools
application with maps (specific facilities)
app with tactile maps
smart glasses / AI (e.g. real time interpreting, orientation)
specific devices that visually impaired use for navigation and communication
audio navigation software (like the indoor GPS, StepHere, Bindi maps, WeMove)
website accessibility for PRM (contrast, underlining, ...) - read & voice
app tactile images: real time information - monitoring close environment - tactile maps that talks to you (for blind, short sighted people, deaf as well)
app like BeMyEyes / VoicesForTheHands - third party interpret
existing apps to be accessible
regulation of accessibility
4. Customer service training
sign language translating services
dedicated assistance points + actual assistance
training for first AID
PRM awareness training (based on the regulation) - for all who are in contact in transport
PRM assistance training - offered on a regular basis / mandatory (e.g. every 6 months)
training for soft skills
special training for emergency situations (part of emergency & contingency plans)
PRM assistance training for wide public
dedicated assistance points
5. Special facilities
service animal facilities
adapted facilities / waiting areas
quite sensory room / silent boxes
special sensory room
playgrounds / dedicated facility areas for guide dogs
playgrounds for children
6. Public transport accessibility
special platforms & stops
low floor vehicles, barrier free stops, elevators
audio navigation sound in vehicles (next stop, terminal station, ...) + outside the vehicles (stations, ...)
visual guidance (information displays)
dedicated seats for disabled
tactile maps of the bus (every bus has different path) - at the bus stops
7. Others
special badge - e.g. sunflower (it is very controversial: awareness might be low; discrimination issue) - should be voluntary

7. KEY STRATEGIC AREAS FOR ENHANCING ACCESSIBILITY

The aim of this chapter is to define specific measures and key strategic areas of action for enhancing accessibility across the Danube Region. This chapter provides actionable recommendations for inclusion strategies, service provision, digital accessibility, the built environment, and transport equipment. It aims to create a unified framework for regional cooperation and harmonized implementation to ensure a more comprehensive and inclusive approach to transport accessibility.

In the context of the DANOVA NEXT project, accessibility of transportation facilities is understood to encompass a comprehensive approach that addresses the diverse needs of passengers with disabilities. To achieve this, the framework focuses on six key areas of action, each aimed at breaking down barriers and promoting inclusive, accessible, and equitable transport systems:

1. Inclusion Strategies: Developing policies and practices that actively involve passengers with disabilities in the design, evaluation, and implementation of accessibility measures.
2. Provision of Services and Support: Ensuring that adequate assistance and tailored services are available to passengers with specific needs.
3. Accessibility of Digital Provisions: Leveraging technology to provide information and navigation tools that are accessible to all passengers.
4. Accessibility of the Built Environment: Addressing physical barriers in transportation facilities to ensure seamless navigation and use.
5. Accessibility of Equipment in the Built Environment: Ensuring that infrastructure, such as signage, ticketing machines, and elevators, meets the needs of diverse users.
6. Accessibility of Vehicles: Enhancing the design and features of transportation vehicles to ensure that they are usable by passengers with disabilities.

These areas collectively ensure that transportation facilities are equipped to support all passengers, including those who are blind, deaf, hard-of-hearing, or have reduced mobility. By implementing measures within these categories, the DANOVA NEXT key strategic areas for enhancing accessibility aim to establish a fully inclusive mobility chain that enables independent and unhindered travel for everyone.

The structure of the text is organized into sections that first introduce the general measures within each area, followed by specific examples derived from collaborative efforts. These examples are based on joint discussions, brainstorming sessions, Transnational Working Group (TWG) meetings, and the Catalogue of Best Practices.

To provide clarity and context, examples and recommendations are marked in brackets with the following indicators:

- (D): Based on discussions.
- (TWG): From TWG meetings.
- (CBP): Derived from the Catalogue of Best Practices.

Measures and recommendations marked with a star (*) are considered the most recommended based on evaluations and expert feedback. This structured approach ensures that stakeholders can effectively understand and implement strategies to create a fully inclusive mobility chain.

7.1. INCLUSION STRATEGIES

7.1.1. Basic considerations regarding inclusion strategies

A cornerstone of a company's active commitment to accessibility is that appropriate rules are defined to which management is guided and to which all employees must adhere.

Inclusion strategies for blind / visually impaired people typically include (general measures):

- Accessibility policies *
- Disability awareness training*
- Customer service standards
- Participatory platforms for strategic advisory by advocacy groups representing persons with disabilities

Inclusion strategies for deaf / hard hearing typically include (general measures):

- Accessibility policies, policy standards -inclusive design (design for all) *
- Disability awareness training *
- Customer service standards
- Participatory platforms for strategic advisory by advocacy groups representing persons with disabilities

Inclusion strategies for PRM passengers typically include (general measures):

- Accessibility policies, policy standards -inclusive design (design for all) *
- Disability awareness training *
- Customer service standards
- Participatory platforms for strategic advisory by advocacy groups representing persons with disabilities

Awareness and understanding of the requirements of passengers with disabilities, including those who are blind, deaf, hard-of-hearing, or have reduced mobility, are key to developing high-quality inclusion strategies and ensuring their effective implementation in practice. Involving representatives of persons with disabilities and experts in the field of accessibility in the development of policies, standards, and staff training is essential to address the actual needs of the target groups comprehensively.

7.1.2. Best examples regarding inclusion strategies

To ensure the ongoing involvement of persons with disabilities and their experts, it is advisable to establish a body that facilitates regular exchanges related to the development of standards and the implementation of accessibility measures. Ideally, this platform should be organized and managed by the transport company or the responsible authority, with consulting experts fairly remunerated for their contributions.

These examples for blind / visually impaired passengers include:

- Accessibility policies, policy standards - inclusive design - The principle of Universal Design (TWG) *
- Disability awareness training (TWG) *

- Participatory platforms for strategic advisory by visually impaired persons' advocacy groups (TWG)
- Bylaw (ensuring the accessibility of buildings for people with disabilities and reduced mobility) (CBP)
- PRM assistance staff training (airport, port) (CBP)
- PRM awareness training (TWG)
- PRM assistance training for wide public (TWG)
- Port / airport / public transport staff training (TWG)
- Know Your Vehicle (detailed orientation instruction in public transport vehicles) (CBP)
- Training for soft skills (TWG)
- Special training for emergency situations (part of emergency & contingency plans) (TWG)
- Space for all: accessible public space for all citizens (manual for engineers/architects) (CBP)
- Handbook for public transport usage (CBP)
- Council for disabled persons (CBP)
- Training for First AID (TWG)
- Consultation regarding TWSI (TWG)
- Training/education of architects, designers and planners (during studies) (TWG)
- General guidebook how to make a website for target groups (Directive EU 2016/2102) (TWG)

These examples for deaf / hard hearing include:

- PRM assistance training for wide public (TWG) *
- PRM staff training (port, airport, public transport, another) + Special training for emergency/unpredicted situations (part of emergency & contingency plans) (TWG) *
- Bylaw (ensuring the accessibility of buildings for people with disabilities and reduced mobility) (CBP)
- PRM awareness training (TWG)
- Training for soft skills (TWG)
- Space for all: accessible public space for all citizens (manual for engineers/architects) (CBP)
- Handbook for public transport usage (CBP)
- Council of disabled persons (CBP)
- Training for First AID (TWG)
- Training/education of architects, designers and planners (during studies) (TWG)
- Sign language training for staff (TWG)
- Training how to communicate with target groups (i.e. sign language training for staff) (TWG)

These examples for PRM passengers include:

- Bylaw (ensuring the accessibility of buildings for people with disabilities and reduced mobility) (CBP) *
- PRM staff training (port, airport, public transport, another) (CBP) *
- PRM awareness training (TWG) *
- Training for soft skills (TWG)
- Special training for emergency situations (part of emergency & contingency plans) (TWG)
- PRM assistance training for wide public (TWG)
- Space for all: accessible public space for all citizens (manual for engineers/architects) (CBP)

- Handbook for public transport usage (CBP)
- Council of disabled persons (CBP)
- Training/education of architects, designers and planners (during studies) (TWG)
- General guidebook how to make a website for target groups (Directive EU 2016/2102) (TWG)

7.2. PROVISION OF SERVICES AND SUPPORT

7.2.1. Basic considerations regarding provision of services and support

Addressing the requirements of passengers with disabilities, including those who are blind, deaf, hard-of-hearing or have reduced mobility, should be an integral part of all standard procedures within transportation facilities. In addition to incorporating accessibility into everyday operations, specific provisions should be implemented to address the unique needs of each group, enabling them to navigate facilities and services independently and with confidence.

Provisions of services and support for blind / visually impaired passengers include (general measures):

- Assistance service *
- Provision of information for orientation via labels, beacons, stickers *
- Support and information via telephone
- Remote support guidance
- Equipment for navigation
- Provision of text information for orientation/navigation
- Tactile maps
- Accessible counters/info points
- Facilities for service animals
- Evacuation concepts/measures

Provisions of services and support for deaf / hard hearing passengers include (general measures):

- Assistance service *
- Remote support guidance *
- Accessible text information (including visualisation of evacuation/critical information (signage)*)
- Provision of information for orientation (labels, stickers)
- Accessible counters/info points with sign language interpreter
- Visual guiding signs
- Flight status information in real time (on websites)
- Disability friendly concept
- Support and information via telephone
- Facilities for service animals

Provisions of services and support for PRM passengers include (general measures):

- Assistance service *
- Accessibility of all approaching roads and terminals *

- Support and information via telephone
- Accessible text information (including visualisation of evacuation/critical information (signage))
- Accessible counters/info points + Adapted seating and waiting areas
- Facilities for service animals

7.2.2. Best examples regarding provision of services and support

“Be my Eyes” is a commonly used smartphone app, where sighted volunteers lend their eyes to solve tasks such as checking expiry dates, determining colours, reading instructions or navigating in new surroundings. The visually impaired person requests assistance on the app. Through the live video call, he or she can communicate directly with the volunteer and solve a problem. The volunteer will help guide a visually impaired person which direction to point the camera, what to focus on or when to turn on the torch. It is also available in a version, where trained staff provides the support or guidance. This version is a good example of an approved system which can be implemented to provide support in relation to a transportation facility. There is another app called “Guide Me”, which works similarly and is focused on public transportation services.

These examples for blind / visually impaired passengers include:

- Audio guidance: audio map for websites (D) *
- PRM calling point (incl. braille signage) (D)*
- Tactile orientation plans (TWG)
- Priority lanes for people with disabilities at airports (CBP)
- Guide dog care (restrooms facilities at airport) (TWG)
- Public dog park at the airport (TWG)
- Support at ticket machines (braille signage + remote connection with agent) (TWG)
- Telephone services / video call service (TWG)
- Smart sticker (TWG)
- Quiet sensory rooms / silent boxes (e.g. at Budapest airport) (TWG)
- QR codes at public transport stations (TWG)
- Guide dog resting spot / service animal facilities (TWG)

These examples for deaf / hard hearing passengers include:

- PRM service at the site (TWG) *
- Remote video interpreting (i.a. Simax-avatars with sign language in any language) (TWG) *
- Priority lanes for people with disabilities at airports (CBP)
- Support at ticket machines (remote connection with agent) (TWG)

These examples PRM passengers include:

- PRM service at the sites + Priority lanes for people with disabilities at airports (CBP) *
- Accessible taxi services (yellow Taxi with specialized equipment for the mobility impaired people / London black taxis - wheelchair-accessible and free-of-access taxis) (CBP)*
- Handbook for architects (CBP)

- Support at ticket machines (remote connection with agent) (TWG)
- Evacuation and emergency concepts (TWG)
- Mobility in demand (Maribor example - The Maister electric vehicle (mobility on demand - free transport in inner city of Maribor) (CBP)

7.3. ACCESSIBILITY OF DIGITAL PROVISIONS

7.3.1. Basic considerations regarding digital provisions

Digital accessibility is a critical aspect of ensuring equitable access for passengers with disabilities, including those who are blind, deaf, hard-of-hearing, or have reduced mobility. Websites, smartphone apps, and other digital tools are now essential sources of information and services that facilitate a seamless travel experience for all passengers. Designing digital provisions with accessibility in mind ensures that everyone can independently access and utilize these resources effectively.

All digital provisions for passengers should be accessible and comply with the Web Content Accessibility Guidelines (WCAG) 2.1 level AA. Adherence to these guidelines minimizes the need for additional or specialized solutions for specific disabilities, aligning with the Universal Design approach to inclusivity. However, tailored support services remain essential in some areas, particularly for navigation and guidance, where specialized digital tools are implemented to meet the unique needs of visually impaired passengers.

Digital provisions play a crucial role in fulfilling the purpose of European legislation, such as the Web Accessibility Directive and the European Accessibility Act, by ensuring equal access to information, services, and facilities, thereby promoting independence and inclusion for passengers with disabilities across the European Union.

Accessibility of digital provisions for blind / partially sighted passengers include (general measures):

- General digital policies, strategies and provisions *
- Digital accessibility of information *
- Specific provisions for visually impaired persons

Accessibility of digital provisions for deaf / hard hearing passengers include (general measures):

- General digital policies, strategies and provisions *
- Digital accessibility of information*
- Specific provisions for visually impaired persons

Accessibility of digital provisions for PRM passengers include (general measures):

- General digital policies, strategies and provisions *
- New assistive technologies *
- Specific provisions for people with reduced mobility
- Digital accessibility of information

7.3.2. Best examples regarding digital provisions

“Budapest Go” is a smartphone app with various functions and services in relation to public transport in Budapest (real-time route planning, ticket shop, information on traffic changes of the lines). It is fully accessible for visually impaired passengers.

These examples for blind / visually impaired passengers include:

- Audio guidance: audio map for websites (D)*
- Information in readable formats (PDF) (TWG)*
- SeeYou - Smart phone app for connection volunteers with visually impaired (CBP)
- Be my eye's app (CBP)
- Guide me: video assistance for travellers (CBP)
- Barrier-free transport information: PID = barrier-free transport finder (CBP)
- Moovit: urban mobility app (CBP)
- NaviLens: navigation and labelling app (CBP)
- Mywaypro: orientation and navigation app for blind and partially sighted users (CBP)
- Lazarillo: guidance for visually impaired persons (CBP)
- Dial-a-ride: door-to-door service for people with long-term disabilities (CBP)
- Naviterier: a specialized navigation app (CBP)
- SpetHear: an intelligent solution providing orientation based on Bluetooth and proximity sensor technology (CBP)
- Newsletter for blind and partially sighted persons (TWG)
- On-line interpretation from/to Slovak sign language (TWG)
- AIRA app (Vienna airport) (TWG)
- Self-describing tactile maps (TWG)
- Urban mobility app (GIS based apps) (TWG)
- Web accessibility (D)

These examples for deaf / hard hearing passengers include:

- Avatar interpreter (e.g. Simax) (TWG)*
- Remote sign language interpreting (TWG)*
- Web accessibility (TWG)
- Speech-to-text transcription (TWG)
- Lipreading translation (TWG)
- QR codes for deaf people with information (TWG)
- Urban mobility app (GIS based apps) (TWG)
- Guide me - Video assistance for travellers (CBP)
- Bindi maps: Navigation application (CBP)

These examples for PRM passengers include:

- Dial-a-ride: door-to-door service for people with long-term disabilities (CBP)*
- Accessible Zagreb: Interactive amp of capital city (CBP) *
- Guide me: video assistance for travellers (TWG)
- Bindi-maps: navigation application (CBP)
- Vozejkmap: app providing maps for wheelchair users (D)
- Barrier-free transport information: PID = barrier-free transport finder (CBP)

7.4. ACCESSIBILITY OF THE BUILT ENVIRONMENT

7.4.1. Basic considerations regarding accessibility of the built environment

Measures that directly impact the built environment are a core aspect of ensuring the accessibility of transportation facilities for all passengers with disabilities. These measures aim to enable safe and independent movement for individuals with visual, auditory, and mobility impairments throughout all areas of a transportation terminal's travel chain. However, the specific requirements and solutions vary depending on the type of disability, making it essential to address the unique needs of each group.

For blind and partially sighted passengers, built environment measures focus on facilitating tactile and auditory navigation, avoiding unnecessary obstacles, and providing visual and tactile safeguards to ensure safe movement. Tactile guidance systems, attention patterns, and high-contrast markings are indispensable tools for this group.

For deaf and hard-of-hearing passengers, the emphasis is on visual communication, with measures such as clear signage, text-based information, and visual warnings replacing auditory signals like alarms or announcements. Visual accessibility of pathways and facilities is critical to ensuring seamless navigation and safety.

For passengers with reduced mobility (PRM), the primary concern is the removal of physical barriers and the provision of accessible pathways, ramps, elevators, and resting areas. Operating elements like ticket machines or call buttons must be designed to accommodate wheelchair users and those with limited dexterity.

The relevance of these measures depends on the type and size of the terminal and the specific situation. By tailoring solutions to the diverse needs of each group, transportation facilities can create environments that are truly inclusive and accessible to all passengers with disabilities.

Accessibility of the built environment for blind / partially sighted passengers include (general measures):

- Visual and tactile orientation *
- Safeguarding at hazardous areas *
- Arrival/departure at the facility
- Accessibility of horizontal/vertical areas
- Accessibility of doors
- Accessibility of vertical circulation
- Accessibility to sanitary areas

Accessibility of the built environment for deaf / hard hearing passengers include (general measures):

- Safeguarding at hazardous areas *
- Visual communication system (direction tables + streets' names) *

Accessibility of the built environment for PRM passengers include (general measures):

- Accessibility of horizontal areas *
- Accessibility to sanitary areas *
- Arrival/departure at the facility
- Safeguarding at hazardous areas
- Accessibility of doors

- Accessibility of vertical circulation

7.4.2. Best examples regarding accessibility of the built environment

Dubrovnik Airport has set up TWSI at the check in area so that passengers can access check in counters or self-check in devices by himself and after check in, PRM service take them to the gate and PRM area (if needed). Note: A too complex system of TWSI can easily be confusing and might even be counterproductive in terms of independent navigation. Therefore, it is important to be careful when selecting areas to be equipped with TWSI and consider sufficient provision of support to supplement the TWSI system.

These examples for blind / visually impaired passengers include:

- TWSI: Tactile walking surface indicators on site (CBP) *
- Voice announcements (e.g. in elevators) (TWG)*
- Tactile zebra crossing sections / Acoustic signals at pedestrian crossings (differentiation of acoustic signal at nearby crossings) (CBP)
- Text description of transport infrastructure (TWG)
- Flight announcements (TWG)
- Audio signals at border crossing (CBP)
- Audio guidance: external and internal voice announcements in public transport vehicles (CBP)
- Braille signage for orientation (on offices, sanitary facilities, doors) (CBP)
- Translation configurator for 3D models and printing in Braille (CBP)
- Guidance/signage - Braille - self-adhesive braille labels (TWG)
- Visual guidance: guidance on the wall (CBP)
- Sanitary facilities for people with disabilities (TWG)
- Access4you: Accessibility certified bus stops (CBP)
- Removal of existing barriers (TWG)

These examples for deaf / hard hearing passengers include:

- Zones with induction loops (TWG) *
- Text description of transport infrastructure and vehicles * (TWG)
- Lighting * (TWG)
- Access4you: accessibility certified bus stops (CBP)

These examples for PRM passengers include:

- Sanitary facilities for people with disabilities on all transport sites (TWG) *
- Ramps, elevator for easy access (TWG) *
- Removal of existing barriers (e.g. reconstruction of stops and making stops accessible) (TWG)
- Accessible counters (e.g. lowered counters at check-in) (TWG)
- Proper dimension of entry doors (for wheelchair) (TWG)
- Direction of door opening (TWG)
- Resting places / benches (e.g. every 60m in Romania) (TWG)
- Access4you: Accessibility certified bus stops (CBP)

7.5. ACCESSIBILITY OF EQUIPMENT IN THE BUILT ENVIRONMENT

7.5.1. Basic considerations regarding accessibility of equipment in the built environment

The built environment contains various elements that play a critical role in ensuring accessibility for all passengers, including those who are blind, deaf, hard-of-hearing, or have reduced mobility. These elements are neither purely digital nor strictly part of the building structure, but they significantly impact the ease with which passengers can navigate and use transportation facilities.

Accessibility of equipment in the built environment includes:

- Self-service terminals such as ticket machines and check-in kiosks, which should be operable by individuals with varying levels of vision, hearing, or mobility.
- Displays, including digital and static signage, which must convey information in a way that is clear and comprehensible to all passengers.
- Acoustic signals and information on demand, which are valuable for blind or partially sighted passengers but should never be the sole means of providing information, as this would exclude passengers who are deaf or hard-of-hearing.

For equipment in the built environment, the design principles outlined in previous sections must be applied with adjustments to cater to the needs of all disability groups:

- For blind and partially sighted passengers, tactile feedback, Braille, and high-contrast visual displays are essential to make equipment operable and accessible.
- For deaf and hard-of-hearing passengers, visual cues and text-based information must replace or supplement audio signals.
- For passengers with reduced mobility (PRM), equipment should be positioned at accessible heights and designed to be easily operable, even by those with limited dexterity or strength.

By ensuring that equipment is designed to meet the diverse needs of all passengers, transportation facilities can create a more inclusive and user-friendly environment.

Accessibility of equipment in the built environment for blind / partially sighted passengers include (general measures):

- Acoustic signals and information on demand via remote control *
- Accessibility of elevators (buttons, safety of elevators, acoustic announcements etc.) *
- Accessible self-service counters/information desks at terminals (technical adaptations including - headphone jacks included, keypads, etc)
- Information displays (mainly for partially sighted) - flight information system tools
- ATM accessible and safe for target groups (SW solution)

Accessibility of equipment in the built environment for deaf / hard hearing passengers include (general measures):

- Visual communication system (direction tables + names of streets) *
- Technical equipment (for remote interpreting) *
- Visual signals

Accessibility of equipment in the built environment for PRM passengers include (general measures):

- Accessible self-service counters/information desks at terminals (with technical adaptations)
- Accessibility of elevators (placement of buttons, safety of elevators, floor surface etc.)

7.5.2. Best examples regarding accessibility of equipment in the built environment

At Vienna International Airport, all ATMs in public areas are equipped with a software that allows blind and partially sighted people to operate them autonomously (audio output and optimized visual display). Money transactions are a very sensitive matter. Therefore, it is especially important to enable unassisted use - even if assistance may be needed to find the self-service terminal.

These examples for blind / visually impaired passengers include:

- Information boards with acoustic announcements (visual electronic information boards at stops equipped with acoustic announcements) (CBP) *
- Tactile orientation plans for all of transport modes (i.e. - tactile map of Maribor = orientation of the city centre) (CBP) *
- Audio guidance - orientation beacons (D)
- Freestanding indoor bus timetable displays in the waiting area on the main bus station (TWG)
- Simplified map of the main bus station (on site and on web page) (TWG)
- Larger printed formats of bus timetables in main bus station (TWG)
- Apass: Interactive map for voice and touch orientation (CBP)
- ATMs with audio output and optimized visual display (TWG)
- Information screens with optimized visual display and placement (TWG)

These examples for deaf / hard hearing passengers include:

- Information boards with live information / announcements (TWG) *
- Visual information displays for emergency information (TWG) *
- Visual alert in emergency situations (included private areas) (TWG) *

These examples for PRM passengers include:

- Simplified map of the main bus station (on site and on web page) (TWG)*
- Display boards / display of arrivals with wheelchair sign (TWG) *
- Freestanding indoor bus timetable displays in the waiting area on the main bus station (D)
- Fire evacuation special chairs (TWG)
- Place marking for the public transport stops for people with disabilities (TWG)
- Accessible pedestrian walking (TWG)

7.6. ACCESSIBILITY OF VEHICLES

7.6.1. Basic considerations regarding accessibility of vehicles

The accessibility of vehicles primarily relates to the onboard experience during the journey. The journey itself is a vital component of the mobility chain, and public transportation providers often participate in the selection, design, and equipping of vehicles. For this reason, this aspect is highlighted to guide decision-makers in aligning vehicle accessibility with the strategies outlined in the DANOVA NEXT key strategic areas for enhancing accessibility.

Accessibility of vehicles includes:

- Announcement of vehicles at the station, ensuring that passengers are informed of arrivals and departures through both audio and visual means.
- Provision of information during the journey, delivered via onboard systems in accessible formats, such as audio announcements, visual displays, or tactile systems where applicable.
- Equipment inside vehicles, such as seating arrangements, handrails, call buttons, and designated spaces for passengers with disabilities.

For onboard accessibility, the following considerations apply to accommodate all disabilities:

- For blind and partially sighted passengers, vehicles must provide clear and continuous audio announcements, tactile buttons, and tactile markings for navigation and safety.
- For deaf and hard-of-hearing passengers, visual systems such as displays for next-stop announcements and flashing light signals for emergencies are essential.
- For passengers with reduced mobility (PRM), vehicles should have accessible boarding options, low floors or ramps, designated wheelchair spaces, and ergonomic seating.

While solutions leveraging technologies like remote controls or smartphone apps can enhance accessibility and user comfort, it is essential that basic information and features are available to all passengers without requiring additional devices. Vehicles designed with inclusivity in mind play a critical role in ensuring that every passenger can travel independently and with dignity.

The relevance of these measures depends on the type and size of the terminal and the specific situation. By tailoring solutions to the diverse needs of each group, transportation facilities can create environments that are truly inclusive and accessible to all passengers with disabilities.

Accessibility of vehicles for blind / partially sighted passengers include (general measures):

- Announcement of the vehicles in the station and timetable of arrivals in the vehicle *
- Equipment inside vehicles (incl. Equipment for unexpected changes during travelling in a vehicle) *

Accessibility of vehicles for deaf / hard hearing passengers include (general measures):

- Visual access to information (actual information about route, incl. unexpected changes information during travelling in a vehicle) *
- Equipment inside vehicles *

Accessibility of vehicles for PRM passengers include (general measures):

- Equipment for unexpected changes during travelling in a vehicle *
- Equipment inside vehicles (space for wheelchairs, buttons, ramps, ...) *

7.6.2. Best examples regarding accessibility of vehicles

Voice announcements are integral part of the public transportation in Zagreb. Trams and buses have external and internal speakers. External speakers tell the number of the vehicle and its direction. Internal speakers tell the status of the door (opening/closing), indicate the current and the next stop. These two announcements must not overlap to be usable.

These examples for blind / visually impaired passengers include:

- Apex use in public transport (communication system for access to public transport) (CBP) *
- Audios navigation sound in vehicle + outside the vehicles (TWG) *
- Intros: Public transport radar (D)
- Dedicated seats for disabled (TWG)
- High contrast design in vehicles (TWG)
- Braille sign marking inside vehicles (TWG)
- Remote control for displaying information about vehicle (D)

These examples for deaf / hard hearing passengers include:

- Visual information displays with live information (TWG) *
- QR codes for specific information in sign language (TWG) *

These examples for PRM passengers include:

- Low floor vehicles, ramps for vehicle (TWG) *
- Barrier-free stops, elevators (TWG) *
- Inclusive doors with wheelchair signs and blue push buttons (D)
- Safety bar for wheelchairs (CBP)
- Speak button to driver in the vehicle / button for wheelchair users in the vehicle (CBP)
- Dedicated seats for disabled (TWG)
- Floors with non-slippery surface (TWG)

The strategic framework for accessibility improvement includes a wide range of recommendations for improving the accessibility of transportation facilities for all passengers with disabilities, including those with visual impairments, hearing impairments, and reduced mobility. While specific rankings highlight the relevance and impact of these measures, the overarching principle remains - accessibility measures must cater comprehensively to the unique needs of each group.

- For passengers with visual impairments, ensuring accessibility requires combining visible, audible, and tactile information. Measures such as tactile guidance systems, signage with high visual contrast, well-lit environments, and audio announcements are indispensable. These solutions provide the necessary tools for blind and partially sighted passengers to navigate transportation facilities independently and safely.

- For deaf and hard-of-hearing passengers, visual communication takes precedence. Clear signage, scrolling text for announcements, and visual cues for auditory messages (such as flashing lights) are critical to ensuring these passengers can fully access information and services. Standardized and familiar solutions across facilities are particularly important for usability.
- For passengers with reduced mobility, eliminating physical barriers is paramount. Wide ramps and doorways, accessible elevators, resting areas, and structural adjustments such as barrier-free platforms ensure equitable access. Additionally, universal design principles should be applied to meet the needs of all passengers without requiring special adaptations.

Across all these groups, the adoption of existing solutions should be prioritized where appropriate, particularly when these solutions already meet accessibility requirements. However, innovative or new measures may be necessary if they provide significant additional advantages or improvements. By balancing standardization with innovation, transportation providers can ensure facilities are not only accessible but also consistently user-friendly across different systems and regions.

8. FRAMEWORK FOR INNOVATION AND EXPLOITATION OF ADVANCED TECHNOLOGIES

Aim of this chapter is to present the DANOVA NEXT Toolkit, framework for innovation and exploitation of advanced technologies, offering practical guidance for transport facilities to adopt and implement advanced technologies that improve accessibility. This chapter emphasizes innovation and scalability, supporting the testing and integration of advanced solutions into pilot actions. It aims to bridge the gap between current accessibility levels and future goals through technology-driven advancements.

In today's rapidly evolving technological landscape, innovation and advanced technologies have become pivotal in addressing societal challenges, including accessibility. Within the Strategy for Accessible Transport in the Danube Region, the integration of advanced solutions serves as a cornerstone for ensuring equitable and inclusive mobility for all, particularly for passengers with disabilities (PWD).

The Danube region, characterized by its geographical diversity and varying levels of technological development, presents both opportunities and challenges in fostering accessibility. Leveraging innovation and advanced technologies not only bridges existing gaps but also sets new benchmarks for inclusivity. From enhancing physical infrastructure to providing seamless digital services, the adoption of smart solutions can transform transportation systems into universally accessible networks.

This chapter highlights the critical importance of innovation and advanced technologies in achieving the strategy's goals. By exploring current practices and envisioning future advancements, it establishes a pathway for integrating transformative technologies that cater to the needs of all passengers. The focus is on identifying scalable and impactful solutions that can be implemented across the region, ensuring sustainable and inclusive transportation systems.

8.1. DANOVA NEXT TOOLKIT

The DANOVA NEXT Toolkit (<https://danova-next-toolkit.com/>) serves as a pivotal resource within the strategy, enabling transport organizations across the Danube Region to evaluate and enhance their accessibility services through innovation and advanced technologies. Rooted in a comprehensive needs assessment and analysis of existing technologies, this toolkit provides a structured pathway for transforming transport facilities into inclusive, barrier-free environments.

The primary goal of the toolkit is to help transport facilities identify areas for improvement in accessibility and operational efficiency. The long-term goal of the toolkit is to enhance transport accessibility across airports, ports, and urban transport facilities.

Toolkit Objectives are:

- Assess accessibility and identify areas for improvement: Provide a structured framework to evaluate and improve transport facilities.
- Transfer knowledge from the Danova Project: Capitalize on the methodologies and insights gained from the previous project.
- Guide to advanced technologies: Offer practical advice on selecting and implementing innovative technologies for accessibility.

Key benefits include:

- Personalized Feedback: Tailored suggestions based on quiz results to improve accessibility.

- Best Practices: Access to practical tips and strategies for enhancing the travel experience for all passengers.
- Inclusive Travel: Encouraging facilities to contribute to a more accessible and welcoming Danube region.
- Compliance Check: Ensuring alignment with the latest accessibility standards and regulations.
- Cost-Efficient Improvements: Identifying small changes with significant impact.

The Danova Next Toolkit website is organized to provide a seamless user experience, featuring the following key components:

1. Homepage: The homepage introduces the toolkit and highlights its purpose and benefits. A compelling "Hero" section includes an inviting Call-to-Action (CTA) button directing users to the self-assessment tool. The page also features a brief description of the project and a carousel showcasing project partners.

2. Self-Assessment Tool: The heart of the toolkit is a 5-page questionnaire with 60 targeted questions, categorized into sections such as "Inside Space," "Outside Space," "Access to Information," and "Providing Support." Each question focuses on a specific aspect of accessibility, and the results are presented as a spider diagram, offering a clear visual overview of strengths and areas needing improvement. Tailored recommendations and links to relevant resources in the Know-How Section are provided upon completion. The self-assessment tool takes only 5-10 minutes to complete and provides immediate, actionable insights.

3. Know-How Section: This section serves as a resource hub, organized into categories matching the assessment tool. It features practical articles, strategies, and tips for implementing improvements, ensuring users can act on their quiz results effectively.

Advanced technologies were carefully analyzed. These technologies were compiled into the Danova Next Toolkit, providing clear instructions and practical advice on how to use them. The toolkit also supports testing new services that improve accessibility, which will be included in pilot activities. The toolkit also features specially formatted articles based on the Updated Catalogue of Best Practices with practical tips and examples of how they can be used.

This makes the toolkit a practical, user-friendly resource for improving accessibility in transport facilities.

8.2. ASSESSMENT OF EFFICIENCY AND GAPS IN TRANSPORT FACILITIES AND CONCRETE FIELDS OF INTERVENTION

Enhancing accessibility in transport facilities across the Danube Region requires a clear understanding of existing efficiencies, gaps, and areas for improvement. This chapter focuses on identifying these aspects for airports, ports, and urban transport systems, providing actionable insights for targeted interventions. By addressing identified gaps, transport facilities can significantly improve accessibility, fostering an inclusive, barrier-free transportation ecosystem.

Key to this transformation are three critical success factors: User-Centric Design, which prioritizes the experiences and feedback of passengers with Disabilities (PWD); Policy Alignment, ensuring compliance with regional and international accessibility standards; and Continuous Innovation, emphasizing the need for ongoing research, development, and adoption of advanced technologies. Together, these principles guide efforts to create a more accessible and equitable transport network in the Danube Region.

8.2.1. Airports

Efficient Areas:

- Assistance Services: Availability of dedicated assistance staff for passengers with disabilities, including escort services and manual wheelchairs.
- Digital Accessibility: Implementation of apps like indoor navigation systems (e.g., Bindimaps) and real-time updates on flight status via accessible platforms.
- Physical Infrastructure: Presence of tactile pathways, elevators with Braille buttons, and accessible toilets.
- PRM Priority Measures: Dedicated check-in counters and priority lanes for disabled passengers.

Lacking Areas:

- Autonomous Mobility: Limited adoption of autonomous wheelchairs and robotic assistants for PRM passengers.
- Sign Language Interpretation: Few options for real-time AI-based sign language support at counters and terminals.
- Dynamic Accessibility Features: Lack of smart ramps and automated boarding solutions.
- Comprehensive Navigation: Absence of AI-based glasses or advanced tools for independent navigation by blind passengers.

Fields of Intervention:

- Deployment of autonomous wheelchairs and robotic assistants for greater independence.
- Introduction of AI-driven real-time sign language interpreters at check-ins and gates.
- Integration of dynamic tactile and audio navigation systems for visually impaired passengers.
- Installation of smart ramps for safer and more efficient boarding.

8.2.2. Ports

Efficient Areas:

- Assistance Services: Provision of on-ground staff support for boarding and disembarking.
- Accessible Design: Basic compliance with barrier-free standards in newly designed terminals.
- Digital Accessibility: Initial implementation of online services and mobile apps for accessible ticketing and information.

Lacking Areas:

- Advanced Assistance Technologies: Limited use of robotic aids or AI-driven systems for PRM passengers.
- Customized Information Displays: Few visual and tactile systems for deaf and blind passengers to access real-time updates.
- Inclusive Boarding Processes: Inadequate provision of smart ramps and boarding lifts for seamless accessibility.
- Wayfinding Technologies: Minimal use of digital twins or 3D mapping for enhanced navigation.

Fields of Intervention:

- Develop digital twin platforms for passengers to plan routes within port areas.
- Incorporate robotic boarding assistants to help PRM passengers navigate terminals.
- Enhance real-time signage and notification systems for deaf and blind passengers.
- Design smart boarding systems that adapt to individual passenger needs.

8.2.3. Urban Transport Facilities

Efficient Areas:

- Basic Accessibility Features: Low-floor vehicles and dedicated spaces for wheelchairs.
- Digital Integration: Some use of urban mobility apps for trip planning, such as Moovit or Navilens.
- PRM Infrastructure: Increasing adoption of ramps and elevators at major stops.

Lacking Areas:

- Real-Time Adaptability: Few systems adjust dynamically to real-world conditions (e.g., overcrowding, delays).
- Advanced Navigation: Limited availability of accessible navigation aids for the visually impaired.
- Sign Language Services: Rare implementation of AI-driven sign language solutions at urban transport hubs.
- Infrastructure Maintenance: Older facilities often lack upgrades to align with modern accessibility standards.

Fields of Intervention:

- Implement AI-based real-time transport updates tailored to PRM needs.
- Develop advanced navigation aids, such as self-guided tactile paths and AR glasses.
- Expand accessible ticketing kiosks with voice guidance and tactile interfaces.
- Modernize older transport hubs by installing smart ramps, tactile paving, and enhanced lighting.

By systematically addressing technological, operational, and human factors, this framework aims to transform the accessibility landscape in the Danube Region, setting a global standard for inclusive transportation.

9. CONCLUSION

The Strategy for Accessible Transport in the Danube Region identifies critical gaps and offers actionable insights to improve accessibility of all passengers across different transport modes in Danube region. It highlights the diverse and specific needs of individuals with visual, hearing, and mobility impairments, revealing persistent barriers such as inadequate signage, inaccessible facilities, and insufficient assistive services. Urban and water transport modes are identified as having the greatest deficiencies, necessitating urgent infrastructure upgrades, enhanced training for staff, and better enforcement of service standards.

The strategy also showcases successful examples of best practices, such as tactile maps, service animal facilities, and disability-awareness training, which can be replicated to enhance accessibility across the region. Moreover, it introduces the innovative DANOVA NEXT assessment framework, a structured methodology to evaluate current accessibility conditions, prioritize interventions, and guide action planning for transport terminals.

It also introduces the DANOVA NEXT Toolkit, a comprehensive resource developed to foster accessibility in transport systems across the Danube Region using innovative technologies and best practices. The toolkit equips policymakers, transport operators, and stakeholders with actionable, technology-driven solutions to address accessibility gaps effectively. Additionally, it fosters a unified approach to innovation and implementation, enabling regional stakeholders to harmonize efforts and achieve greater impact.

These findings collectively provide a foundation for creating a more inclusive and accessible transport system in the Danube Region.

APPENDIX 1: SUMMARY DESCRIPTION OF THE SITUATION BY COUNTRY AND MODE OF TRANSPORT

Summary describes accessibility challenges faced by persons with disabilities (PWDs) across different transport modes (air, urban, and water) in various countries. The summary is prepared based on the DANOVA NEXT result - deliverable *D.1.1.4: Assessment feedback report* which contains feedback collected from the target users through the local workshops and the online survey.

CROATIA (Dubrovnik Airport; Pula Port Authority; Croatian Union of Associations of Persons with Disabilities)

Air transport

In Croatia, air transport for persons with disabilities (PWD) is viewed positively but has notable gaps in accessibility and service quality. While the legislative framework for Persons with Reduced Mobility (PRM) is satisfactory, inconsistencies in implementation are evident. Communication during flight disruptions and the lack of dedicated waiting areas for PWDs, particularly those with guide dogs, are common challenges. Additionally, the poor quality of announcements at airports and on planes, and reluctance from staff to accept suggestions from PWDs, add to the difficulties. Electric wheelchairs sometimes face operational issues, particularly with safety standards and transfers, leading to delays. Despite these issues, the overall accessibility of the transport terminals is rated as satisfactory.

Urban transport

Urban public transport shows significant gaps in both infrastructure and service for PWDs. While some accessibility measures, such as announcements at bus stops, have improved, there is much room for progress. Also, there is a big difference in the accessibility of public transport in the city and public transport in small, local areas, which is mostly inaccessible. Challenges include malfunctioning auditory systems, inaccessible parts of public transport vehicles (e.g., high steps), and inadequate digital accessibility. There is also a lack of guiding lines for the blind, and tactile surfaces and audible signals are missing at intersections. Public transport staff generally lack sufficient training in communication with PWDs, although some progress has been made through initiatives like the European Mobility Week. Furthermore, the occupation of public spaces by service activities and construction works significantly hinder access.

Water transport

Water transport is the least accessible mode in Croatia. The legislation for PRM in ports is inadequate, and infrastructure remains largely unsupportive of independent travel for PWDs.

Maritime transport lacks proper accessibility features like ramps wide enough for wheelchairs and tactile/sound guides for the blind. The Port of Dubrovnik, in particular, is criticized for its limited use and dangerous pathways. There are few adapted ferries or vessels, leaving many PWDs facing safety and comfort issues during travel. Accessibility in harbors and on vessels remains an urgent issue to be addressed, particularly with the installation of guiding lines, tactile surfaces, and proper maintenance.

HUNGARY (Budapest Airport))

Air transport

In Hungary, air transport regulations mandate accessibility for persons with reduced mobility (PRMs) and uphold the "reasonable accommodation" principle. Despite these standards, practical implementation challenges remain, as both PRMs and service providers often lack awareness or knowledge of rights and requirements. Communication accessibility efforts focus on Deaf and hard-of-hearing individuals with visual aids and speaker systems, though uniform standards and updated regulations are lacking, leading to inconsistencies. Airport service quality for PRMs is satisfactory, but infrastructure improvements—such as lower counters, spacious security checks, wider corridors and fewer boarding obstacles—are needed. Staff training is beneficial but requires expansion, especially for handling mobility aids. While AMS (Airport Assistance Service) staff receive training, learning from best practices in other sectors could enhance service. Accessible taxis are available but in limited supply. Information monitors help with navigation, though inconsistencies and inadequate visual signals pose challenges, especially for Deaf passengers. Misunderstandings arise in crowded areas where visual cues could improve accessibility. Tactile paths for blind passengers are often incomplete, creating difficulties, and post-security assistance is limited. Additionally, airline websites remain inaccessible for ticketing and seat selection, often requiring external assistance.

Urban and water transport

Data specific to urban and water transport were not detailed in the feedback provided.

MONTENEGRO (Airports of Montenegro; Port of Kotor)

Air transport

In Montenegro, the 2008 Law on Planning and Construction and its accompanying Rulebook on Technical Standards mandate physical accessibility in public buildings, including airports, to support unimpeded access for persons with disabilities, children, and the elderly. However, in practice, compliance is inconsistent, and enforcement is weak. Furthermore, the Rulebook lacks provisions for persons with reduced mobility and includes only minimal support for persons with hearing impairments. Montenegro's airports are gradually improving, yet significant infrastructure challenges remain. Enhanced services for PRM are critical, from accessible parking and counters to clear signage, especially for the visually impaired and deaf individuals. Staff training in accessibility and sign language is seen as essential to address communication needs, while public awareness is limited. Additionally, accessible information desks, road signs, and support during boarding and disembarking are recommended improvements. Parking issues persist due to limited accessible spaces and inadequate enforcement, limiting effective PRM use of airport facilities.

Urban transport

Despite legal requirements for accessible public facilities, there is significant non-compliance across public areas and institutions, especially in urban centers like Kotor. Enforcement is weak, and many accessible facilities remain isolated, creating broader navigation challenges for persons with disabilities. Most urban spaces in Montenegro, particularly in Kotor, are inaccessible. Limited enforcement means that few buildings and public areas adhere to accessibility standards. Advocacy is strong for educational efforts, with proposals for accessible communication training in schools and public sector training in PWD integration. Suggested adaptations include ramps, elevators, induction loops, and visual information screens in public facilities to support equitable urban accessibility.

Water transport

The accessibility framework extends to port facilities under the Law on Planning and Construction, though compliance remains inconsistent. Accessibility in ports is hindered by nearby public areas that lack adaptation, limiting overall access for persons with disabilities. Water transport accessibility, especially at the Port of Kotor, is challenging due to the lack of a disembarkation platform for yacht passengers with reduced mobility. Staff training in accessibility support is recommended, alongside the installation of equipment such as sea-level elevators and wheelchair accessible ramps. Additional support structures like wheelchairs and information desks for sea arrivals are also proposed to enhance accessibility for yacht passengers with reduced mobility.

BOSNIA AND HERZEGOVINA (Sarajevo International Airport)

Air transport

In Bosnia and Herzegovina, air transport legislation for persons with disabilities, aligns with EU Regulation 1107/2006. This regulation, integrated into the national Law on Obligations in Civil Aviation, allows passengers with reduced mobility to declare their needs when purchasing tickets and request assistance at least 48 hours before travel. Airport operators are then required to provide support throughout the airport journey. While this framework offers some rights, further improvements are needed, particularly to address the needs of deaf and hard of hearing

individuals, whose population is approximately 20,000 in the Federation of Bosnia and Herzegovina. Deaf and hard of hearing individuals express general satisfaction with the support they receive at airports. However, they highlight a need for staff trained in basic sign language to facilitate smoother communication. For example, it was suggested that airport personnel should know at least 100 sign language terms.

Urban transport

Dissatisfaction is notable in urban and bus transport, where the main challenges include a lack of staff trained in sign language, inadequate announcements at bus and train stations, and insufficient accessible infrastructure. Passengers suggested adding visual announcements across all urban transportation modes to make travel more inclusive.

Water transport

Data specific to water transport was not detailed in the provided feedback.

SLOVENIA (University of Maribor; Municipality of Maribor)

In Slovenia, knowledge about accessible transportation legislation for persons with disabilities is limited. Some individuals are aware of specific legal protections, but there is a general lack of awareness due to factors like insufficient publication, inconsistency in services across regions, and limited access to information in accessible formats. Improved dissemination of this information and legal development would help create a more inclusive transportation system.

Air transport

Air transport is generally rated positively, but accessibility and service quality depend on the provider and location. Staff helpfulness varies widely, and there is an overall need for consistent information about delays and other updates, particularly through alternative communication methods for persons

with hearing impairments (e.g., text alerts or sign language support). Staff training in disability etiquette could also enhance the experience of air passengers with disabilities.

Urban transport

Urban transport accessibility is rated as medium, with noticeable disparities between larger cities (e.g., Ljubljana) and other areas. Common issues include inconsistent accessibility features across vehicles, unclear information about stops and routes, and a lack of staff awareness regarding the needs of visually impaired and hearing-impaired passengers. For mobility impairments, poor sidewalk conditions and a lack of accessible taxis create challenges, as does the inconsistency in transport infrastructure across regions. Improving training for urban transport staff and standardizing accessibility across vehicles and routes are recommended.

Water transport

Specific feedback on water transport accessibility was not provided, but a general call for consistent improvements across all transport types was noted.

CZECH REPUBLIC (Czech Smart City Cluster)

Air transport

Czech air transport is well-regulated by EU Regulation 1107/2006, which ensures accessible services for persons with disabilities, including wheelchair transport, assistance from airport entry to boarding, and free transport of guide dogs. Prague Airport offers an advanced booking assistance service, though challenges persist for blind and visually impaired individuals due to limited tactile guidance, small lettering on signs, and excessive glass surfaces. While orientation beacons assist with navigation, there is a lack of Braille signage, making it difficult for blind passengers to orient themselves independently. Emergency announcements are typically delivered via audio only, which poses a barrier for deaf passengers. Staff training, especially at security checks, would benefit from improvement to better accommodate persons with disabilities. There is also discomfort in boarding aircraft when accessible boarding platforms or specialized seating are not available.

Urban transport

Urban transport legislation in the Czech Republic is relatively well-developed, with the provision of "ZTP" certificates offering free or discounted travel for persons with disabilities in many cities. The country also provides a monthly mobility allowance, though support in rural areas is minimal. In larger cities, urban transport quality is generally high, with well-equipped vehicles featuring both visual and audio information systems. Newer buses and trams provide large-font displays and accessible buttons with Braille for visually impaired passengers. However, rural areas lag in accessible infrastructure and consistency of services. Common challenges in urban transport include a lack of sign language interpreters and materials for deaf passengers, audio-only announcements during emergencies, and nonfunctioning audio guidance systems. Additionally, designated areas for passengers with disabilities are sometimes occupied by other travelers, and gaps between platforms and vehicles make boarding difficult. Staff knowledge and willingness to help are generally rated positively in larger cities, though specialized training is recommended to ensure staff can meet diverse needs consistently across locations. Terminals in urban areas are increasingly equipped with modern visual information systems,

though improvements are needed in areas like clear, accessible tactile paths for visually impaired passengers.

Water transport

No specific legislative framework or feedback data on water transport accessibility was provided, as the target group had limited experience with this mode of transportation.

SLOVAKIA (Public Transport Company Bratislava)

Urban transport

The legislative framework governing construction in Slovakia is considered satisfactory, addressing many technical infrastructure specifics. However, there is a significant gap in the legislation regarding the provision of information for passengers, particularly in the context of urban transport. This inadequacy highlights the need for improved legislative measures to ensure accessible information for blind and partially sighted individuals. Urban transport in Bratislava and other Slovak cities is generally well-regarded, with an extensive network of buses, trams, and trolleybuses. The system is characterized by high-frequency services, widespread coverage, and modern vehicles, which are seen positively by users, including those who are blind or partially sighted. Despite this progress, some challenges remain in ensuring consistent accessibility. For blind and partially sighted passengers, certain technical issues persist. Vehicles sometimes fail to stop at designated platform points, particularly when multiple vehicles arrive simultaneously. Additionally, technical problems with acoustic information systems—used to announce stops or provide line numbers—disrupt accessibility. Space limitations on designated seats make it difficult for passengers with guide dogs to travel comfortably. Ticket vending machines and the Integrated Transport System app are not fully accessible, and SMS ticketing lacks options for discounted fares for passengers with disabilities. Tactile guidance paths are available and appreciated, though sound signals at traffic lights are inconsistently audible in high-noise environments or are sometimes disabled during off-peak hours. Transport terminals are being renovated to include accessible features, such as modern shelters and electronic visual boards that offer both visual and acoustic information. However, narrow platform widths, obstacles in tactile paths, and obstructions to electronic board visibility are recurring issues. Interactions with drivers are generally positive, as drivers assist blind and partially sighted passengers by announcing the line number, destination, and stop notifications. Conversely, ticket inspectors rarely provide similar verbal cues. Information accessibility is rated high, with printed timetables, real-time electronic boards, and smartphone updates available, though the lack of a unified, fully accessible app limits convenience.

Air and water transport

Data specific to air and water transport were not detailed in the provided feedback.

ROMANIA (Romanian National Association of the Deaf)

Air transport

There are limited legal benefits for persons with disabilities, particularly for deaf and hard of hearing individuals, with no discounts for internal flights. The legislative framework faces criticism for its

ambiguity, leading to dysfunction in accessible services. Air transport is generally considered low quality, with inadequate accessible services for wheelchair users and untrained staff, leading to discomfort and safety concerns. Smaller airports are particularly problematic due to insufficient facilities. Lack of specialized assistance from entry to boarding poses significant challenges and navigating security checks can be difficult for those with physical disabilities. Additionally, accessible toilets do not meet national or international standards.

Urban transport

National laws provide some benefits for deaf individuals, such as free urban transport and a limited number of free tickets for registered disability certificate holders. However, there are no specific provisions for rural areas, and benefits depend on local regulations. The quality of urban transport services is generally rated as poor to medium. Issues include poorly designed infrastructure, untrained employees, and a lack of accessibility features in vehicles. Deaf individuals face challenges with communication, particularly in understanding announcements, while PRM users experience difficulties due to inadequate facilities and staff attitudes. The situation is worsened by a lack of awareness among passengers regarding designated spaces for individuals with disabilities, leading to their misuse.

Water transport

There are no specific legislative benefits mentioned for individuals with disabilities in water transport. Accessibility issues are prevalent, with significant gaps in compliance with standards. Water transport is largely inaccessible, with inadequate boarding facilities on vessels and non-compliant pontoons. Feedback on water transport indicates that it is insufficient and lacks the necessary accommodation for persons with disabilities, leaving many passengers at a disadvantage.

BULGARIA (Bularian Association for Transfer of Technology and Innovation – BATTI)

Air transport

The legislative framework for air transport is well-regulated for persons with disabilities. However, the enforcement of these laws is inconsistent, leading to non-compliance. There is a need for more effective monitoring and stricter penalties for violations. Air transport services are rated poorly, with significant difficulties in terminal navigation for visually impaired

individuals due to the absence of tactile pathways and inadequate staff training. High placement and small print of information signs create challenges for those with reduced vision. Orientation is nearly impossible without a companion, and boarding is uncomfortable for those with mobility impairments due to the lack of necessary equipment and special seating. Staff often lack training in assisting passengers with disabilities, leading to unethical practices in handling sensitive situations.

Urban transport

The legal framework is similarly strong, but like air transport, it suffers from a lack of adherence and enforcement. Urban transport services are rated very poorly, with major obstacles in navigation for visually impaired users due to inadequate infrastructure and disrupted tactile paths. Information systems are often confusing or defunct, making it challenging for individuals to know which bus is arriving. Buses are frequently overcrowded, complicating the boarding process for persons with

disabilities. Inadequate training among staff further exacerbates the challenges, leading to a lack of assistance when needed.

Water transport

The legislative framework for water transport is similar for air and urban transport. The enforcement of existing laws is inconsistent, leading to non-compliance. There is a need for more effective monitoring and stricter penalties for violations. Water transport services are generally viewed as unsafe and inaccessible, leading most individuals with disabilities to avoid this mode of transport entirely. Feedback on this mode is minimal due to infrequent use, highlighting a gap in services and safety concerns for disabled passengers.

MOLDOVA (Chisinau International Airport)

Air transport

The air transport sector in Moldova is governed by several regulations, including Regulation (EC) 1107/2006, which mandates that Chisinau International Airport provide special assistance to persons with disabilities and those with reduced mobility (PRM). The overall assessment of air transport services indicates that most aspects are classified as accessible and acceptable, with a low need for intervention. However, there are notable challenges, particularly for visually impaired passengers. Issues include insufficient visual contrast in navigation signs and excessive glare, which hinder wayfinding. Personal assistive technologies are absent, and there is no Tactile Wayfinding and Signage Information (TWSI) available. Pathway design, especially in the car park area, is inadequate, and check-in and passport control counters are not fully accessible for wheelchair users. Chisinau International Airport offers a range of assistance services, including help at check-in counters, security procedures, customs and emigration, and support during boarding and disembarkation. Trained staff provide these services, but the airport's website and app lack accessibility compliance, making it difficult for users to access

important information. Moreover, there is no video call service available for passengers with hearing impairments.

Urban and water transport

Data specific to urban and water transport were not detailed in the feedback provided.

AUSTRIA (Austrian Federation of the Blind and Partially Sighted; Vienna University of Economics and Business))

Air transport

Austria has a well-regulated legal framework for air transport concerning persons with disabilities, compliant with EU regulations. This ensures that individuals with disabilities can access air travel services adequately. However, there is a noted absence of a unified regulation for all modes of transport. Air travel in Austria is generally effective for persons with disabilities. However, some challenges exist, such as insufficient information about delays and cancellations. Assistance services are available at airports, but the flow of information regarding these services can be inadequate. Overall, air transport is considered one of the better options for travelers with disabilities in Austria.

Urban transport

The legal framework for urban public transport in Austria is not as robust as that for air and international rail transport. There are numerous exceptions in existing regulations, and implementation of EU guidelines is inconsistent. Complaints mechanisms for local transport are limited, making it difficult for passengers to report issues. Urban transport presents significant challenges for persons with disabilities. Common difficulties include insufficient information about services, lack of acoustic signals at stops, and outdated infrastructure. Many vehicles are overcrowded, and the competition for space between prams, bicycles, and persons with disabilities exacerbates accessibility issues. Additionally, staff training in assisting passengers with disabilities is often inadequate, leading to poor communication and support.

Water transport

There is little clarity regarding the legal framework for water transport in Austria. Participants in the workshop noted a lack of awareness of any existing regulations, indicating potential gaps in accessibility for this mode of transport. Water transport services are generally perceived as outdated and inaccessible, with many vessels and ports lacking the necessary adaptations for persons with disabilities. As a result, individuals with disabilities may avoid using water transport due to safety and accessibility concerns.

Introduction to the evaluation matrix

During the Transnational Working Group (TWG) meetings, participants collaborated to develop an evaluation matrix with specific criteria to rank the solutions presented in the Catalogue of Best Practices. This structured ranking provides final users, such as decision-makers and stakeholders, with clear guidance to better understand and prioritize the most effective solutions for accessibility in transportation facilities.

The evaluation process involved all 16 project partners, who assessed each solution based on the agreed-upon criteria. The resulting rankings highlight the relevance, feasibility, and impact of each measure, offering a valuable tool for orienting stakeholders in selecting and implementing the most appropriate solutions.

By creating a transparent and systematic evaluation method, the DANOVA NEXT project ensures that the selected solutions align with the needs of passengers with disabilities while also meeting practical considerations such as cost-effectiveness and scalability.

Criteria for evaluation

The evaluation matrix is based on eight carefully designed criteria, each addressing a key aspect of accessibility solutions. These criteria ensure a holistic assessment, covering the impact, feasibility, and practicality of each measure:

- 1) Individual Assessment (1–10 points) = Each partner rated the perceived importance or impact of a solution based on their expertise and understanding.
 - 1–3: Minimal significance
 - 4–6: Moderate significance
 - 7–10: High significance
- 2) Target Group Coverage (Max 6 points) = Measures were evaluated based on the number of target groups they benefit.
 - 2 points: Affects one target group
 - 4 points: Affects two target groups
 - 6 points: Affects all major target groups
- 3) Cost = Solutions were rated based on their estimated affordability.
 - 1 point: High cost (difficult to afford or budget for)
 - 3–4 points: Moderate cost (requires some budgeting effort)
 - 6 points: Low cost (affordable or low financial impact)
- 4) User-Friendliness (Max 6 points) = The likelihood of a solution being accepted and utilized by end users.
 - 1 point: Low likelihood of user adoption
 - 3–4 points: Moderate likelihood of user adoption
 - 6 points: High likelihood of user adoption
- 5) Durability = How long a solution is expected to last before requiring replacement or upgrades.

- 1 point: Short lifespan (one-time usage)
 - 3–4 points: Medium lifespan
 - 6 points: Long lifespan
- 6) Scalability (Max 6 points) = The ease with which a solution can be expanded or adapted to different regions or systems.
- 1 point: Difficult to scale
 - 3–4 points: Moderately scalable
 - 6 points: Highly scalable
- 7) Integration Speed (Max 6 points) = The time required to implement the solution.
- 1 point: Long-term implementation (more than 2 years)
 - 3–4 points: Medium-term implementation
 - 6 points: Short-term implementation (immediately)
- 8) Ease of Implementation (Max 6 points) = The simplicity of integrating the solution into existing systems.
- 1 point: Complex (requires significant changes or resources)
 - 3–4 points: Moderate (some adjustments needed)
 - 6 points: Simple (easy to integrate with minimal disruption)

These criteria ensure a thorough and balanced evaluation, enabling stakeholders to make informed decisions about which solutions to prioritize in their efforts to improve accessibility.

Final ranking of solutions

The following table presents the final ranking of solutions evaluated during the DANOVA NEXT project. This ranking is based on the comprehensive evaluation conducted by all 16 project partners, using the established criteria to assess the relevance, impact, and feasibility of each solution. The solutions listed here originate from the Catalogue of Best Practices and represent a wide range of measures designed to enhance the accessibility of transportation facilities for passengers with disabilities.

The final ranking provides valuable guidance for decision-makers and stakeholders, helping them prioritize solutions that have been determined to be the most impactful and practical for implementation. Each entry includes the total points scored during the evaluation process, reflecting its overall effectiveness across the key criteria.

Table 1: Catalogue of best practices – solutions ranking

Ranking	Total points	Name of the Best practice
1	782,00	Council for disabled (Maribor)
2	779,00	Handbook for public transport usage (Austria)
3	763,00	Provision of mobility and family service at information desk
4	752,00	BINDI maps: navigation application
5	750,00	Simplified map of the main bus stations (Maribor)
6	744,00	Timetables in readable PDFs
7	743,00	Larger printed formats of bus timetables in main bus stations

8	733,00	Public transport staff training
8	733,00	Dial-a-ride: Door-to-door service
8	733,00	PID: Barrier-free transport finder
11	731,00	Special assistance - provision of safe escort (airport)
12	721,00	PRM calling point (incl. Braille signage)
13	715,00	PRM Assistance staff training (airport)
14	714,00	Access4you: Accessibility certified bus stops
15	711,00	Guide me video assistance for travellers
16	710,00	Be my eyes app
16	710,00	Moovit - Urban mobility app
18	701,00	Speak button to drive in vehicle
18	701,00	Vozejkmap: App for wheelchair users
20	699,00	Sanitary facilities for people with disabilities
21	696,00	Acoustic flight announcements before boarding
22	693,00	Priority lane for people with disabilities (airport)
23	692,00	Support at ticket machines
24	688,00	Acoustic signals at pedestrian crossings (differentiation of signal)
24	688,00	Voice announcements in public transport vehicles
24	688,00	Voices for hands - video remote interpreting
27	686,00	Accessible Zagreb: Interactive map of capital city (accessibility)
27	686,00	Online interpretation from/to Slovak and sign language
29	683,00	Text description of transport infrastructure
29	683,00	Tactile map of Maribor
31	679,00	Guidance/signage-Braille: self-adhesive braille labels (airports)
32	678,00	Lazarillo: Guidance for visually impaired
33	675,00	Orientation instruction in public transport (one-time event)
34	672,00	Port staff training
34	672,00	Inclusive doors with wheelchair signs / blue push buttons
34	672,00	Naviterier: navigation app
37	671,00	Accessible bus stops
38	670,00	SeeYou - app for connection volunteers with visually impaired
39	664,00	Display board with wheelchair sign (info about low-floor vehicles)
39	664,00	NaviLens - navigation and labelling app.
41	661,00	Freestanding indoor bus timetable displays
41	661,00	Tactile orientation plan (airport)
41	661,00	Apex use in public transport
44	658,00	APass: Interactive map for voice and touch orientation
44	658,00	MYWAYPRO: Orientation & navigation app
46	648,00	Tactile orientation plan (port)
47	647,00	Slavica: Video remote interpretation (translation/interpretation to Croatian sign language)
48	645,00	INTROS - Public transport radar
49	644,00	Visual guidance on the wall (dark blue stripes on all white walls)
50	643,00	Accessible public space for all citizens - manual
51	642,00	Safety bar for wheelchairs in public transport
52	639,00	Taxi for people with disabilities
53	635,00	Braille signage for orientation (facilities, doors, offices)
53	635,00	Tactile walking surface indicators in airport
55	632,00	StepHear - orientation (Bluetooth & proximity sensor technology)

56	631,00	Audio guidance - audio map for websites (Hungary)
57	625,00	London black taxis: wheelchair-accessible
58	621,00	Information boards with acoustic announcements (Slovakia)
59	620,00	Tactile Pedestrian Zebra Crossing Sections
60	615,00	BYLAW ensuring accessibility
61	611,00	The Maister electric vehicle - mobility on demand
62	606,00	Translation configurator for 3D models and printing in Braille
63	604,00	Tactile walking surface indicators in ports
64	564,00	Guide dog care - restrooms facilities at airport
65	508,00	Orientation beacons - audio guidance (public transport/buildings)
66	454,00	Public dog park at the airport