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DANOVA NEXT

D.2.1.1 JOINT FRAMEWORK FOR ESTABLISHMENT OF SMART TRANSPORTATION NETWORK

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1. INTRODUCTION

Overview of the DANOVA NEXT Project

The DANOVA NEXT project aims to address the persistent challenges faced by Passengers with Reduced Mobility in the Danube Region by enhancing transport accessibility through innovative digital solutions. The project focuses on air, water, and urban transport, ensuring that digital travel information services are fully accessible and that a Smart Network of transport facilities is established. By integrating advanced technologies and fostering cross-border collaboration, DANOVA NEXT seeks to bridge the innovation gap in accessibility and digital transformation across the DR.

The main objectives of the project include:

- Developing a strategy for accessible transport across the Danube Region.
- Establishing a Smart Transport Network for PRM digital accessibility.
- Implementing customized pilot participatory actions to test accessibility solutions.
- Creating a replication package for expanding best practices beyond project partners.

The main beneficiaries of DANOVA NEXT include:

- Airport, port, and urban transport providers and authorities, who will enhance accessibility infrastructure and digital services.
- PRM user groups and advocacy organizations, ensuring the inclusion of visually and hearing-impaired passengers.
- Local, regional, and national public authorities, supporting policy harmonization and regulatory alignment.

Through the capitalization of past DANOVA project efforts, DANOVA NEXT aims to further integrate accessibility and innovation in the region, developing a unified approach to tackle disparities, enhance DTIS, and create a more inclusive transport ecosystem.

Importance of Digital Accessibility in Transport

In today's rapidly evolving digital landscape, accessibility in transport is more than just a convenience; it is a fundamental right that ensures independence, mobility, and equal opportunities for all passengers, including those with disabilities. Digital travel information services (DTIS) have the potential to bridge the accessibility gap by providing real-time updates, seamless navigation, and user-friendly booking systems. However, many transport networks still struggle to meet the needs of passengers with reduced mobility (PRM) due to fragmented data systems, non-standardized accessibility information, and a lack of integration across different transport modes.

For individuals with disabilities, inaccessible transport information creates significant barriers to mobility. Without clear, real-time updates on schedules, station accessibility, and service disruptions, PRM users often face uncertainty and increased dependence on others. This limits their ability to travel freely, access employment opportunities, and participate fully in social and cultural activities. The lack of accessibility in transport systems not only affects PRM passengers but also impacts the elderly, parents with strollers, and travelers with temporary impairments.

Digital accessibility in transport is about ensuring that all passengers, regardless of their abilities, have equitable access to travel information. Modern technology, including AI-driven chatbots, voice navigation, screen readers, and IoT-enabled transport hubs, offers innovative solutions to address these challenges. By leveraging these tools, transport systems can provide real-time travel updates, step-by-step navigation assistance, and accessible booking platforms. Standardized data formats and interoperability between different transport providers further enhance the travel experience by allowing passengers to plan and execute multi-modal journeys seamlessly.

Ensuring digital accessibility also fosters social and economic inclusion. When transport systems prioritize accessibility, they empower PRM users to participate actively in society, access education and employment, and travel with greater confidence. The implementation of inclusive digital solutions not only enhances passenger satisfaction but also aligns with legal frameworks and international accessibility standards such as the Web Content Accessibility Guidelines (WCAG) and the European standard EN 301 549.

The DANOVA NEXT project recognizes these challenges and is committed to advancing digital accessibility in transport across the Danube Region. By integrating innovative digital solutions and fostering cross-border collaboration, the project seeks to create a Smart Transport Network that ensures seamless accessibility for PRM passengers. Through the development of standardized data-sharing frameworks, improved digital interfaces, and real-time accessibility updates, DANOVA NEXT aims to bridge the innovation gap and set a new benchmark for inclusive mobility.

By prioritizing digital accessibility in transport, we move toward a future where mobility is not restricted by disability but rather enhanced by technology. Accessible digital transport solutions benefit not only PRM users but all passengers, making travel more efficient, reliable, and user-friendly for everyone.

Purpose and Scope of the Document

The purpose of this document is to establish a common framework for digital accessibility in transport, ensuring that Passengers with Reduced Mobility (PRM), including those with visual, hearing, and other mobility impairments, have equal access to digital travel information. By defining a standardized approach to digital accessibility, this document aims to create a Smart Transport Network that integrates various transport modes, facilities, and organizations committed to providing fully accessible digital data.

One of the primary objectives of this document is to address key barriers to digital accessibility in transport systems across the Danube Region. These barriers include the quality and diversity of accessibility data, the availability of standardized formats to facilitate interoperability, and the accuracy and completeness of information available to PRM users. Without uniformity in how accessibility data is collected and shared, passengers often face inconsistencies that hinder their ability to navigate transport systems independently. Ensuring that digital travel information is provided in consistent, structured, and accessible formats is essential for improving user experience and enabling the deployment of innovative digital solutions.

This document also outlines key objectives for developing useful digital tools, ensuring that technology serves the real needs of PRM users. A core principle of the framework is the active involvement of PRM users in the design, testing, and refinement of digital solutions. Their feedback and lived experiences are essential for creating digital tools that are both functional and genuinely user-friendly.

The development of this framework is based on an inclusive and participatory approach. Project partners have conducted focus groups with key stakeholders, including PRM associations, transport providers, and public authorities. The insights gathered from these discussions have been shared among project partners to develop a harmonized framework at the Danube Region level. This joint approach ensures that the framework reflects regional needs, aligns with best practices in digital accessibility, and supports cross-border cooperation among transport operators.

The document is structured to provide a comprehensive roadmap for achieving digital accessibility in transport. It presents the spheres of intervention identified through research and stakeholder engagement, details the harmonized framework development process, and outlines the steps needed to establish a Smart Network of Accessible Transport. Additionally, it offers recommendations for future work, ensuring that transport providers, policymakers, and technology developers can continue improving accessibility beyond the project's implementation phase.

By defining clear guidelines for digital accessibility, this document serves as a blueprint for inclusive mobility in the Danube Region. It sets the foundation for long-term improvements in digital travel information services, fostering a transport network that is not only technologically advanced but also universally accessible to all passengers.

2. IDENTIFIED SPHERES OF INTERVENTION

The spheres of intervention regarding digital accessibility were identified through a combination of workshops and an online survey aimed at target users, including persons with visual, hearing, and physical impairments, as well as the collaborative efforts of DANOVA NEXT project partners, integrating diverse perspectives to develop a user-centered and inclusive framework. By analyzing the gaps between user needs and existing services, the following key areas for intervention were identified:

- Booking of services
- Procedures for accessing transport facilities
- Assistance to passengers with disabilities and accessibility of services
- Availability of real-time information
- Feedback mechanisms for users with disabilities
- Procedures for ensuring the rights of passengers with disabilities
- Cooperation with other stakeholders

To bridge the identified gaps between user needs and the existing services, it is crucial to consider not only targeted interventions but also the quality and diversity of the accessibility data available. In essence, while the analysis highlights key areas for intervention, these efforts must be underpinned by harmonized and standardized data formats, as well as robust protocols for data collection, maintenance, and exchange, ensuring consistency and reliability across stakeholders.

2.1. QUALITY AND DIVERSITY OF ACCESSIBILITY DATA

One of the key challenges in ensuring digital accessibility for passengers with disabilities is the lack of standardized data formats across transport systems. Variations in how accessibility data is collected, categorized, and shared create inconsistencies that limit the effectiveness of digital travel information services (DTIS). The absence of unified guidelines for accessibility data reporting makes it difficult to integrate information across different digital platforms, hindering seamless travel experiences for passengers with disabilities. To improve accessibility data usability, it is essential to establish standardized formats that ensure consistency and compatibility across digital platforms. Harmonized data formats would enable the seamless exchange of information between various service providers, improving journey planning, real-time updates, and overall service efficiency for passengers with disabilities and also facilitating the deployment of innovative digital solutions.

To build a comprehensive and reliable accessibility data framework, multiple sources of information need to be leveraged, including:

- Transport Providers: Public transport operators, railway companies, and aviation service providers can supply firsthand data on station layouts, vehicle accessibility, and available assistance services.
- Mapping Services: Digital mapping providers can integrate accessibility data to enhance route planning for PRM passengers.
- IoT Devices: Sensors and smart infrastructure, such as beacons in transport hubs or connected mobility aids, can provide real-time updates on accessibility conditions, including elevator functionality and congestion levels.

Effective data-sharing agreements between stakeholders are essential to ensure the continuous flow of accurate and up-to-date accessibility information. These agreements should outline protocols for data

collection, maintenance, and exchange, ensuring compliance with data protection regulations and accessibility standards. Cross-border collaboration between transport authorities, technology providers, and advocacy groups can foster a more integrated and efficient digital ecosystem for accessible transport solutions. Encouraging open data initiatives and interoperability between systems will further support the development of digital travel information services that cater to the needs of passengers with disabilities.

The need for standard formats to improve digital solutions for all target groups includes the consideration of technical requirements in the design and specific services used by the target groups. Data compatibility with text information, screen readers and other information accessibility is primarily ensured by compliance with WCAG 2.2.

For fixed terminals in transport stations, EN 301 549, which refers to WCAG 2.1, must be applied. Interface requirements are compiled by surveying all target users on framework conditions. In addition to the supporting technologies in the hardware and software used by the target groups (smartphones and PC/laptops), the following key factors are important for cross-border data compatibility:

For blind people

- Accessibility to real-time information for orientation and navigation
- Navigating through the app interface using screen readers
- Access to information about the accessibility and location of transportation stations

For partially sighted people

- Accessible information with adjustable contrast and font sizes
- An intuitive interface navigable by keyboard and touch screen
- Audio descriptions for relevant visual content

For deaf and hard of hearing people

- Clear visual notifications for all important alerts
- Access to real-time text transcriptions for orientation and navigation information
- Ability to view written information in place of audio announcements

For people with reduced mobility using Voice Control assistive software

- Accessible infrastructure: This includes ramps, elevators, wide pathways and accessible seating areas ensuring that public transport terminals are physically navigable for individuals with reduced mobility. Well-designed infrastructure removes physical barriers and allows independent movement throughout the terminal.

- Real-time, accessible information: Clear, accessible updates on schedules, delays, and platform changes are essential. Visual displays, audio announcements and accessible digital interfaces (such as apps compatible with voice commands or screen readers) help users with reduced mobility make informed travel decisions.

- Reliable assistance and emergency support: The availability of trained staff, emergency call buttons and designated assistance services offers crucial support in cases where additional help

is needed. This safety net ensures that users feel secure and confident when navigating terminals autonomously.

Similarly, framework conditions have been provided for user-friendliness in the design of the following elements:

- Structure and navigation
- Hyperlinks
- Buttons
- Forms
- Layout and graphic content
- Video content
- Audio content
- Text content
- Status messages (messages that provide information about the success or results of an action, the progress of a process or the existence of errors)

In addition, design features are to be defined for the following functions and services:

a. Timetable information
b. Information and booking of trips/tickets
c. Information for orientation and navigation
d. Remote guidance and support
e. Chat service

Exchanging common mistakes in the design and use of smartphones or PCs that the target groups face will help to ensure cross-border data compatibility.

2.2. LACK OF ACCURACY/COMPLETENESS IN ACCESSIBILITY OF DATA

2.2.1. Impact on PRM users' acceptance and trust

The lack of accuracy and completeness of accessibility data can have a significant negative impact on Passengers with Reduced Mobility ("PRM"), particularly in terms of their acceptance and trust in certain services, infrastructure, or digital tools. Here are some key aspects of this impact:

a. Loss of trust in information and the system

If users repeatedly encounter inaccurate or incomplete accessibility information, they may lose trust in the sources of that information, whether they are websites, apps, or official guides.

Example: A public transport app claims that a certain station is accessible, but upon arrival, the user discovers that the elevator is out of order or that there is an unexpected step.

b. Reduced willingness to use public services and spaces
    - Persons with mobility impairments may avoid certain services, locations, or means of transportation due to unreliable information.

- This can limit their mobility and participation in social, professional, and cultural activities.

c. Increased Stress and Uncertainty

Incomplete accessibility data can lead to unforeseen obstacles, increasing stress for users and potentially causing uncomfortable or even dangerous situations. For example, if a wheelchair user plans a journey based on incorrect information, they may find themselves stranded without a viable alternative.

d. Lower adoption of new technologies and solutions

If digital platforms (e.g., navigation or booking apps) frequently provide unreliable data, PRM users may stop using them, making it harder to develop and improve accessibility-focused technologies.

This can slow down digital inclusion and force users to rely on less efficient ways of planning their travel or activities.

e. Negative Impact on the Perception of Inclusivity

Poor accessibility information can lead to the perception that a particular destination, company, or institution does not prioritize inclusivity, potentially harming its reputation among people with disabilities and beyond.

Accurate and complete accessibility data is essential for building trust and enabling PRM users to feel safe and independent in public spaces and services. Organizations should regularly update information, incorporate user feedback, and leverage technology (e.g., crowdsourcing) to ensure reliable data that genuinely improves the quality of life for users with mobility impairments.

2.2.2. Strategies to improve data accuracy

Improving the accuracy of accessibility data in transportation is essential for ensuring safe, reliable, and inclusive mobility for persons with reduced mobility (PRM). Below are strategies that can enhance the precision and reliability of such data.

a. Regular updates and data verification
   - Implementing a system for automatic and manual updates of accessibility data (e.g., elevator status, ramps, low-floor vehicles).
   - Conducting inspections and field checks to ensure that data aligns with real-world conditions.
   - Utilizing IoT sensors and smart technology to monitor malfunctions (e.g., sensors on elevators that provide real-time status updates).

b. Involving users in data collection
   - Crowdsourcing data through apps and platforms that allow passengers to report inaccuracies in accessibility information.
   - Implementing feedback systems in digital tools where users can rate the accuracy of information.

- Collaborating with **organizations for people with disabilities**, which can provide detailed insights into real-world barriers and needs.

c. Enhancing Digital Tools and Platforms
   - **Integrating real-time data** into navigation and transportation apps (e.g., Google Maps, Moovit).
   - Developing **accessible user interfaces** that display accessibility information (icons, voice instructions, alternative routes).
   - Enabling **personalized settings**, allowing users to filter information based on their specific needs.

d. Standardizing data and ensuring interoperability
   - Applying **unified standards** for labeling and sharing accessibility data in transportation.
   - Ensuring **interoperability** between different transport systems so that all providers share updated data (buses, trains, trams, taxi services).
   - Collaborating with **government institutions** to include accessibility in legal regulations and mandatory guidelines for transport providers.

e. Utilizing artificial intelligence and analytics
   - AI systems for **predictive analysis** that can anticipate elevator or ramp failures before they occur.
   - Big data processing to **analyze trends** and identify recurring accessibility issues.
   - Implementing **chatbots and virtual assistants** that provide real-time accessibility updates to users.

Enhancing the accuracy of accessibility data in transportation requires a combination of technology, user engagement, and data standardization. By integrating automated systems, crowdsourcing, and analytics, it is possible to ensure reliable information that enables PRM users to travel more safely and efficiently.

3. KEY OBJECTIVES FOR ACHIEVING USEFUL DIGITAL TOOL

The advancement of digital tools in the transport sector has the potential to improve accessibility, efficiency, and user experience, particularly for Passengers with Reduced Mobility (PRM). However, the successful implementation of these tools depends on well-defined objectives that ensure their usefulness, inclusivity, and reliability. The following key objectives outline the foundational principles necessary to achieve truly effective digital tools in transport accessibility.

3.1. ENSURING A STRONG USER-CENTERED DESIGN APPROACH

At the core of effective digital tools is a user-centered design that prioritizes the needs and experiences of all travelers, particularly PRM users. The design process must actively involve end users from the early stages of development, ensuring that accessibility barriers are eliminated before implementation. By integrating universal design principles and adhering to WCAG 2.2 standards, digital tools can become more inclusive and adaptable to diverse needs.

Key considerations:

- Direct collaboration with PRM users to test, refine, and validate digital platforms.
- Implementation of assistive technology compatibility, including screen readers, text-to-speech, and high-contrast settings.
- Adoption of clear, intuitive interfaces to reduce complexity and enhance navigation.
- Ongoing usability testing and iterative improvements based on real-world usage.

Without active involvement of PRM users, digital tools risk overlooking critical accessibility challenges, leading to exclusionary solutions. Therefore, participatory design methodologies must be embedded in every development phase.

3.2. INVOLVEMENT AND CONTINUOUS FEEDBACK FROM PRM USERS

A fundamental challenge in digital accessibility is the lack of real-world insights from those who rely on these tools the most. To ensure relevance and effectiveness, digital transport solutions must include structured feedback mechanisms that allow PRM users to report issues, suggest improvements, and shape future updates.

Key strategies:

- Crowdsourced feedback tools: Mobile apps should integrate real-time reporting features where users can flag accessibility issues (e.g., broken elevators, inaccessible booking options).
- Community engagement sessions: Regular focus groups, surveys, and co-creation workshops should be held with PRM advocacy groups to refine digital tools.
- Transparent response mechanisms: Users must be assured that their feedback is actively considered, with visible updates based on their input.
- User-driven enhancements: Digital platforms should evolve in response to actual needs rather than assumptions, ensuring an ongoing cycle of improvement.

By embedding PRM feedback loops, digital tools can remain dynamic and truly cater to the evolving needs of diverse travelers.

3.3. Seamless Integration Across Transport Modes

To maximize usability, digital tools must support interoperability between different transport systems. A unified digital framework should be established to integrate services across airports, train stations, bus networks, and maritime transport, ensuring that PRM users can access a single, synchronized platform for planning, booking, and navigating multi-modal journeys.

Key goals:

- Standardized data-sharing agreements among transport providers.
- Cross-platform compatibility (e.g., mobile apps that work across different transport services).
- A centralized user account system allowing seamless bookings across various transport modes.

A well-integrated system ensures that PRM travelers can transition smoothly between different transport networks without accessibility disruptions.

3.4. Real-Time Information Provision

Reliable real-time updates are essential for ensuring safe and stress-free travel experiences. Digital tools should provide instant access to information such as:

- Transport schedules and delays
- Accessibility infrastructure status (e.g., elevator availability, wheelchair-accessible routes)
- Emergency notifications in accessible formats

These updates should be delivered through multiple channels, including:

- Mobile applications (text, audio, and visual alerts).
- Public digital displays at stations and terminals.
- Voice-assisted technology for those who rely on spoken information.

Providing real-time updates enhances predictability and control over the travel experience, reducing uncertainty for PRM users.

3.5. Standardization of Digital Data Formats

One of the biggest obstacles to digital accessibility is the inconsistency of transport data across systems. To ensure uniformity and reliability, digital tools should adopt a standardized framework that aligns with international accessibility regulations.

Key measures:

- Compliance with WCAG 2.2 and EN 301 549 for both digital platforms and fixed terminals.
- Harmonization of accessibility data formats, ensuring that all transport providers use the same structured information.
- Machine-readable open data for transport information, allowing third-party applications to integrate accessibility data.

Standardization reduces fragmentation and ensures consistent access to reliable information across all transport services.

3.6. Personalization and Adaptive Features

Digital tools should offer customizable settings that accommodate individual user needs. PRM users should have the flexibility to adjust the interface according to their preferences, ensuring a personalized and comfortable experience.

Key features:

- Text-to-speech functionalities for blind and visually impaired users.
- Adjustable contrast and font sizes for partially sighted individuals.
- Multilingual support for international travelers with disabilities.
- Alternative navigation methods, such as gesture-based or voice-controlled interfaces.

By allowing users to custom-tailor their digital interactions, accessibility barriers can be significantly minimized.

3.7. Integration of AI and Smart Technologies

Artificial Intelligence (AI) and the Internet of Things (IoT) can revolutionize transport accessibility. Smart systems can detect accessibility needs proactively, improving efficiency and ease of travel.

Potential applications:

- AI-powered chatbots for real-time assistance.
- IoT-enabled beacons to provide navigation support in large terminals.
- Predictive analytics to anticipate and prevent service disruptions affecting PRM travelers.

Integrating AI ensures faster, more responsive digital support systems, making transport services smarter and more inclusive.

3.8. Stakeholder Collaboration and Cross-Sector Partnerships

Effective digital tool implementation requires strong partnerships between:

- Transport providers
- Policy makers
- Technology firms
- Disability advocacy organizations

Collaboration should focus on:

- Developing universal digital accessibility policies.
- Co-designing solutions with input from PRM user communities.
- Promoting data-sharing initiatives to enhance cross-border transport accessibility.

Unified collaboration ensures that accessibility initiatives remain sustainable and widely adopted.

3.9. Security, Privacy, and Ethical Considerations

As digital tools become more interconnected, data security and user privacy must be a priority. Compliance with GDPR and other data protection laws is essential to maintain user trust.

Key priorities:

- Encryption and secure authentication for digital transport platforms.
- Minimization of personal data collection, ensuring privacy.
- Bias-free AI algorithms to prevent discrimination in accessibility services.

A strong ethical framework ensures that digital tools are secure, fair, and equitable for all users.

3.10. Sustainability and Future-Proofing

Digital tools should be scalable and adaptable to future advancements. Open-source and modular design approaches should be encouraged to ensure long-term sustainability.

Future-proofing strategies:

- Regular system updates to comply with emerging accessibility standards.
- Integration with next-generation assistive technologies.
- Scalable infrastructure to support future transport innovations.

By designing flexible and adaptive digital solutions, transport accessibility can evolve alongside technological advancements.

4. HARMONIZED FRAMEWORK DEVELOPMENT PROCESS

The development of a harmonized framework for PRM ("Passengers with reduced mobility") digital accessibility is a key step toward establishing a Smart Transport Network that ensures seamless and inclusive travel for all passengers. The primary objective was to assess the current accessibility of digital travel information services and data provided by transport authorities with the aim of the collected inputs and contributions to be integrated into the framework.

4.1. DATA COLLECTION

To ensure that data was collected comprehensively and from diverse perspectives, a twofold approach was adopted:

1. Local Focus Group Meetings (In-Person)

Organized by 10 transport project partners, these meetings were held in local settings where transport authorities could participate directly in discussions. The sessions followed a structured agenda with presentations on project progress and results. In some cases, additional stakeholders, including PRM users and disability advocacy groups, were invited to ensure a broader discussion. A workshop format allowed participants to discuss digital travel information services (DTIS) accessibility across different transport modes, providing hands-on insights into the existing challenges. The objectives of the focus groups were to:

- Assess the current accessibility of data and digital travel information services provided by transport authorities;
- Exchange of experiences and gather direct feedback from transport authorities on the challenges they face in providing accessible digital services, along with their suggestions for improvement;
- Encourage transport authorities to adopt best practices and improve accessibility through better data formats, interoperability, and enhanced cooperation with stakeholders.

Transport authorities were encouraged to fill out questionnaires on-site, with project partners later entering the data into the online system for analysis. The results from these live meetings were compiled into meeting minutes and thematic comments, which were submitted for further analysis.

The focus groups also helped facilitate future cooperation, as the participating authorities were invited to join the Smart Transport Network, a long-term initiative aimed at improving PRM digital accessibility across the Danube Region.

2. Survey Questionnaire (Broad Outreach)

To expand participation, an online survey was sent to local, regional, and national transport companies, public authorities and mobility service providers across all project countries. The questionnaire was a result of collaboration among project partners and was structured into seven sections with 26 questions, covering:

- Booking of services
- Procedures for accessing transport facilities
- Assistance to passengers with disabilities and accessibility of services
- Availability of real-time information
- Feedback mechanisms for users with disabilities
- Procedures for rights of passengers with disabilities
- Cooperation with other stakeholders

The following section will present a detailed analysis of the results from both the focus group meetings and the online questionnaire, highlighting the key findings and insights gathered from transport authorities and other stakeholders.

4.2. Analysis of Stakeholder Insights on Digital Accessibility

4.2.1. Input from Focus Groups: Key Findings

The following section presents insights from nine focus group meetings, where transport authorities and stakeholders discussed key aspects of digital accessibility in transportation. From the meeting minutes, only feedback directly related to digital accessibility was highlighted and categorized into key themes.

4.2.1.1. Needs Assessment (Problems Detected):

Challenges with Digital Accessibility of Booking Systems

Passengers with disabilities often struggle with inconsistent services in booking systems in different transport modes. There is a need for improvement in accessibility for booking systems as they may be inaccessible due to compatibility issues with assistive technologies or overly complex systems. There are no read-aloud functions in apps, which can complicate the process for individuals who cannot use apps themselves. Web tools are not sufficiently developed, with users, particularly older passengers, relying on call centers due to their reluctance to use digital tools. There is no separate dedicated information channel for PRM passengers, and telephone services are still heavily relied upon for communication, which can be an obstacle for those with certain disabilities. Urban transport services, especially buses, often do not have dedicated booking systems or accessible vehicles for passengers with disabilities. On-site assistance is offered, but not all staff are aware or willing to provide help.

Insufficient Accessibility Information

Information regarding accessibility and procedures for passengers with disabilities is inconsistent. The procedures for passengers with disabilities are not sufficiently well explained, with missing or inadequate information on websites. There is insufficiently published information for passengers regarding arrival procedures, such as what to expect, where to go and information regarding other available modes of transportation to reach their final destination, all of which should be provided in accessible formats. Passengers with disabilities do not have adequate information regarding the accessibility of destinations they are traveling to as no specific details about destination accessibility are offered, which limits the planning ability of passengers with disabilities.

Lack of Real-Time Information

Real-time information is sometimes completely missing, which becomes critical during sudden changes in schedules and routes. This is especially pronounced in urban transportation systems where inconsistent transmission of Real-Time data is noted, causing accessibility challenges for passengers relying on timely information. There is insufficient access to information for deaf passengers at airports, as most information is conveyed through public address systems, which are not accessible for those with hearing impairments.

Insufficiently developed Feedback Mechanisms.

There is a lack of formalized feedback collection particularly for passengers with disabilities with airlines collecting most passenger feedback, but this is not as common in other sectors.

Inconsistency in Accessibility Across Providers

There is a significant inconsistency among transport providers, where some focus on fine-tuning their services, while others lack even basic accessibility services for passengers with disabilities. Some transport companies are not yet fully focused on digital accessibility. While physical assistance is available, digital accessibility (especially website optimization) remains an area for improvement.

4.2.1.2. Proposed Innovations

Improvement of Booking System Accessibility

Establishing multiple communication methods, such as phone services, email (for passengers with speech impairments), and app-based booking with screen reading functions, would greatly improve accessibility. Transport operators should improve reservation systems to make them compatible with assistive technologies and simpler to use for individuals with different types of disabilities. Implementing operator services where passengers with special needs can easily make requests and receive assistance would help create more personalized support for passengers with disabilities.

Implementation and provision of information on rights and procedures for passengers with disabilities

Clear, accessible, and consistent information about the rights of passengers with disabilities should be available across all transport modes, especially in the maritime and urban transport sectors, where this is often lacking. It would be helpful for transport services to add dedicated sections on their websites with accessibility information, including how to request assistance, passenger rights, and available facilities for passengers with disabilities. There should be a standardized approach to providing assistance services for passengers with disabilities, ensuring that they are available at all stages of the journey, from booking to arrival at the destination. Providing accessible and comprehensive information about the accessibility of destinations would help passengers with disabilities plan their trips better.

Provision of accessible Real-Time information

Real-time information delivery is crucial for the assurance of accessibility of transportation services for passengers with disabilities. Real-time travel updates should be available through multiple

formats, including electronic boards, audio announcements, and direct notifications via mobile apps to accommodate different accessibility needs. In urban transportation systems, a mobile app or a signaling system that allows passengers with disabilities (and other groups, such as parents with strollers) to notify drivers in advance of their assistance needs could be beneficial. The installation of induction loops for hearing aids at information counters and sign language avatars could greatly improve communication for deaf and hard-of-hearing passengers, ensuring they receive timely and accurate information.

Integration of assistive technologies

Digital platforms should be designed and optimized to accommodate users with diverse disabilities. The integration of assistive technologies such as screen readers, voice control, captioning services, alternative text for images and customization options into both the digital systems and on-site facilities for all transport modes would cater to passengers with varying disabilities. Digital tools should be offered in multiple languages to meet the needs of users familiar with these languages and standardized across platforms to create a seamless and inclusive digital experience for all users.

Involvement of Target Groups in Digital Accessibility Development

It was emphasized that representatives of target groups should be involved early in the planning and testing phases of accessibility projects to ensure the tools meet the needs of those they aim to assist. Regular accessibility audits should be conducted, and accessibility experts should be involved in communication with target groups to ensure ongoing improvements.

Establishment of structured feedback systems

Transport providers should implement systems to actively collect feedback from passengers with disabilities to assess satisfaction levels and identify areas for improvement of both digital and physical services. Some companies are beginning to do this, but further efforts are needed for improvement in the accessibility of digital tools.

Increased Cooperation Among Stakeholders

Due to the lack of uniformity in accessibility standards, there is a need for greater cooperation between different transport operators, technology firms, and public service providers to address accessibility challenges and improve the travel experience for all passengers, especially those with disabilities. As some companies mistakenly perceive certain challenges as insurmountable, it is crucial to consult with target groups (disability advocacy groups) to ensure that the services provided meet the actual needs of these passengers. Integrating transport systems across transport providers and implementing a unified fare system would simplify travel, reduce the need for passengers to adapt to separate systems, and enhance accessibility across different transport modes.

The majority of respondents expressed interest in joining a Smart Network of Accessible Transports for sharing data and information on PRM digital accessibility within the DANOVA NEXT project. A smaller portion was either undecided or not interested. This demonstrates a willingness among stakeholders to collaborate, which is already a step forward in improving accessibility efforts. Most respondents also expressed interest in evaluating the adoption and promotion of the DANOVA NEXT app, which aims to provide fully accessible digital travel information services for people with disabilities throughout their journey.

4.2.2. Input from Questionnaire results

The following section provides an overview of the data collected through the Questionnaire, starting with the organizational data of the transportation companies surveyed and further proceeding to the results related to digital accessibility.

A total of 55 responses were collected. The highest number of responses came from Croatia (11) and Bulgaria (10), followed by Bosnia and Herzegovina (6), the Czech Republic (5), Romania (5) and Slovakia (4). The type of transportation that survey respondents represent are mostly urban (45.5%), air (23.6%) and water (16.4%), followed by railway (7.5%).

Considering respondents background concerning the answers given about digital accessibility most of the respondents (58.2%) have given their responses based on consultation with people who are responsible for implementing accessibility policies in their company, are themselves personally involved in developing services (45.5%) and/or obtained feedback from users with disabilities (36.4%). Familiarity with company accessibility policies and reports, expertise in digital accessibility or personal experience in the usage of digital tools and services also influenced in regard to answers given, though to a slightly lesser extent.

The analysis of the Questionnaire results related to digital accessibility will be presented following the structure of the Questionnaire sections/topics as follows:

Booking of services

The typical ways users book services is through digital platforms, through contact with customer services or by visiting physical service counters, with alternative ways of booking services being significantly less common. When surveyed regarding the accessibility of digital booking systems, the vast majority of the respondents stated that the systems are partially accessible or challenging to use, with some responding that they are not accessible at all. The features that are most commonly supported include font size/type adjustment options, high contrast mode and screen reader compatibility. Keyboard navigation and text-to-speech functionality are only occasionally featured/supported.

Procedures for accessing transport facility

The vast majority of transportation providers stated that information regarding the procedures for accessing transportation services and facilities is available through company websites, apps, or direct communication at service counters. Printed materials or brochures are used less frequently, while a smaller portion of respondents indicated that no specific accessibility information is provided. Information is mostly available only in text format and not optimized for all disabilities. About a fifth of the respondents stated that no specific measures have been implemented to ensure the accessibility of information. However, many respondents also reported using digital formats that comply with web accessibility requirements and are compatible with all assistive technologies. Step-by-step instructions in easy-to-read formats were also commonly used.

Assistance to PRM passengers and accessibility of services

Regarding methods of booking special assistance for passengers with disabilities, respondents answered that special assistance services are predominantly booked by contacting customer services and requesting assistance on-site. Passengers with disabilities request services through

the company's digital platforms to a lesser extent, but it's still frequently used. Regarding information about accessible services for passengers with disabilities and reduced mobility provided on the company's digital platforms, most respondents answered that limited information is provided digitally, with only basic text descriptions of available accessible services. About a quarter of respondents answered that no comprehensive information about accessible services is currently integrated into their digital platforms. Some stated that accessibility details are displayed through dedicated sections on websites or apps, including text, videos, and icons for easy comprehension. Few offered interactive maps and virtual tours of terminals compatible with assistive technologies. Regarding the availability of information in formats accessible to people with disabilities, respondents mainly state that usage of accessible formats is only partial or limited, with some voting accessible formats not being used at all. Only a minority state that they have the information available in all accessible formats.

Availability of real-time information

The responses regarding updates on works in progress, disruptions or changes in services that could affect accessibility indicate that while digital platforms do provide updates on service disruptions or changes affecting accessibility, the accessibility of these updates varies. Some respondents confirmed that updates are available in accessible formats, but a larger portion noted that while updates are provided, they are not always accessible. Others highlighted that the information is often limited or unclear, while a minority stated that no updates are provided at all. When inquired about the ways of assurance that the communicated information is accessible, most quoted the usage plain language and simple visuals, as well as visual and audio announcements. However, the majority noted that while information is shared, it is not specifically designed for accessibility, and some indicated that communication remains inaccessible.

Regarding the accessibility of timetables and schedules on digital platforms for people with disabilities, the majority of respondents indicated that accessibility is limited or that some accessibility issues exist. A smaller group stated that schedules are available in formats compatible with assistive technologies, while some stated that no accessible formats are provided.

Feedback mechanisms for users with disabilities

The majority of respondents indicated that feedback used to assess the satisfaction of passengers with disabilities is gathered informally and only on occasion rather than through structured processes, with some having no formal feedback mechanisms at all. A fewer number of organizations conduct regular surveys or organize focus groups to engage directly with users. Most respondents rely on limited internal reviews to verify data accessibility. A smaller portion of respondents use automated tools for checking compatibility, while fewer conduct accessibility audits by trained professionals. A notable percentage reported that no verification processes are in place at all.

The involvement of passengers with disabilities in the development and evaluation of accessibility tools is primarily through feedback collection during or after implementation .Their involvement is limited to specific phases of the process rather than being continuous. Collaboration with NGOs, associations, or advocacy organizations representing the target group is also a common approach. Active participation in testing or workshops is significantly less frequent, and a notable portion of respondents indicated that passengers with disabilities are not directly involved at all.

When inquired about the strategies that could increase participation, the most frequently mentioned approaches were organizing community engagement sessions and partnering with advocacy groups. Some respondents also suggested offering incentives to encourage participation, while others felt that the current strategies in place are sufficient.

In regards to the challenges in ensuring data accessibility, respondents most commonly cited difficulties in integrating accessibility standards as well as limited technical expertise and resources. Other challenges included a lack of feedback from target groups and low interest from employees.

Procedures for rights of passengers with disabilities

Information regarding policies and passenger rights for passengers with disabilities and reduced mobility is generally communicated on digital platforms, but a significant portion of respondents indicated that while the information is available online, it can be difficult to locate. Others stated that policies are not prominently communicated through digital platforms. While some reported that the information is presented and designed for accessibility, the majority indicated that accessibility remains limited or that the content is only partially accessible, with some reporting that it is not available in an accessible format at all.

Cooperation with stakeholders

Regarding the availability of information on the accessibility of tourist destinations on transport company websites, most respondents indicated that such information is either not available or not fully accessible. Only a smaller portion of respondents stated that accessibility details are available on company websites.

When examining the effectiveness of stakeholder collaboration, the majority of respondents placed collaboration somewhere in the middle range, with most responding that it is only moderately effective. Stakeholders face several challenges when collaborating to implement or optimize Digital Travel Information Services (DTIS) in traffic systems. The most commonly reported difficulties include challenges in integrating different technologies or platforms, as well as limited financial resources to support development, implementation, and maintenance. Additionally, many respondents highlighted difficulties in coordination, including aligning goals, priorities, and responsibilities among stakeholders. Concerns related to data privacy, security, and a general reluctance to share real-time information were also noted as barriers to effective cooperation.

5. Establishing of Smart Network across transport modes

The digital transformation of the transportation sector is increasingly significant in respect of inclusive mobility and in reaching universal design (UD) principles and goals in accessibility of infrastructure and data, especially for PRM, who face substantial barriers when navigating public transport systems. With advancements in technology, smart transportation systems can create a more accessible and inclusive environment for these individuals. UD relies on seven principles: equitable use; flexibility in use; simple and intuitive use; perceptible information; tolerance for error; low physical error; and size and space for approach and use It is expanded from the accessibility of infrastructure to digital content accessibility. Different aspects of UD have also been taken into consideration in developing the framework.

PRM are facing many accessibility challenges during their journey, such as insufficient accessible infrastructure, lack of real-time information, difficulty in navigating complex systems, and inadequate customer service. Therefore, digital information systems are seen as a transformative tool to mitigate these challenges. Traditionally, transport systems have provided basic information through signs, announcements, and static schedules, which can be difficult or impossible for individuals with visual, auditory, or cognitive impairments to access. Digital solutions, including mobile apps, smart sensors, and real-time data, offer the potential to overcome these barriers and provide customized, accessible information.

Within the DANOVA NEXT project, the importance of accessibility of Digital Travel Information Services (DTIS) has been recognised, as one of the major project objectives is the establishment of a Smart Network among transport facilities for PRM digital accessibility of data (further “Smart Network”) in the Danube region. The establishment of the Smart Network will allow project partners to cooperate transnationally for the definition of a reference framework, assessment and collection of standardized data, information and services for accessible mobility, fostering the continuous exchange of practices, approaches and solutions among airports, ports and local urban transport companies.

Project partners have formalised their participation in Smart Network through signing of Letter of Intent by which they have committed to future develop and exploit project results within their own institution and to upscale project results to their relevant stakeholders and to promote and include other interested parties in Smart Network.

Through activities performed in earlier project stages and by the input from target users, stakeholders and transport facilities working groups several key areas of interventions for digital data accessibility are identified: booking of services and assistance for PRM; procedures for accessing transport facilities; real-time information availability; feedback mechanism; PRM procedures for rights; cooperation with stakeholders. This aspect has been taken into consideration when creating the DANOVA NEXT framework and digital data accessibility framework.

5.1. Digital Data Accessible Provision Framework

One of the integral aspects of establishing a Smart Network is to provide a Digital Data Accessible Framework (DDAF) as an essential guideline to ensure that digital data related to transportation systems (real-time schedules information, routes, terminal layouts, booking of services) is accessible to all, including people with various disabilities.

To achieve this, digital data needs to be presented in a usable, accessible and meaningful way for PRM. According to the WCAG, four principles have to be obeyed (POUR): Perceivability refers to presentation of digital content in a way that users can perceive (providing alternative text for images; captions for videos, and adaptable content that can be resized, contrasted, or interpreted differently). Operability implies that digital interfaces must be operable by all users, regardless of the input devices they use. This principle ensures that all interactive elements of digital content (buttons, menus, links, etc.) are easy to navigate and use. It includes keyboard navigability, the use of assistive technologies (such as voice recognition), and compatibility with alternative input devices like switches or eye-tracking systems. Understandability ensures that digital content should be easy to understand and use, text should be written in plain language, and instructions should be clear, while Robustness refers to the fact that digital content should be robust enough to work across a wide variety of technologies, including assistive technologies.

This principle can be applied to all industries, including the transport sector by implementing it, PRM will have equal opportunities in the digital world, increasing their independence, raising quality of life and improving social inclusion, making their journey more seamless. Within the DANOVA NEXT project, the need for improving accessibility of data for PRM passengers has been recognised in the early project phase, through assessment of the current situation of service providers partners, user feedback, work of transport focus groups and experts, as well as online questionnaires on current practice among DR infrastructure service providers and best practices researched.

Comprehensive DDAF in the transport sector should take into consideration several key elements

Relevant information - information provided needs to be of relevance for PRM users. Information regarding procedures on how to book services, how to book assistance in transport facilities or information, procedures on how to access transport facilities, wayfinding within transport terminal, accessibility features in the transport terminal and procedures for rights for PRM are minimum required information that should be available in accessible format. Providing this information will enable PRM to better plan their journey and to be more independent during their travel.

Standardization of data formats - one of the primary challenges faced by PRM is the inconsistency and lack of standardization in how transport data / information is provided. Data should be presented in universal accessible formats and standards.

Integration with assistive technologies - digital data provision must be compatible with a variety of assistive technologies used by PRM (screen readers for people with visual impairments, voice recognition software for individuals with mobility challenges, and captioning tools for the hearing impaired).

Real-time information accessibility - data has to be presented to PRM in real time in transport systems in accessible format, not only data regarding travel schedules and possible delays or changes, but also data regarding accessibility of terminal infrastructure and facilities in the terminal. Frameworks should ensure that real-time data is available in formats that people with disabilities can access seamlessly, regardless of the technology they are using.

User-oriented design - design of digital data systems as well as relevant information to be provided for transport must consider the specific needs of PRM. This includes designing easy-to-navigate interfaces, providing clear and concise information, and allowing for customization based on individual preferences. In developing such content on the website and app, it is important to introduce PRM feedback and expert advice from the early stage of development.

Stakeholder collaboration - achieving digital accessibility in transport requires collaboration between various stakeholders, including transport providers, government agencies, technology developers, and disability advocacy groups. This cooperation can result in the development of systems that are not only accessible but also effective in meeting the needs of PRM, providing relevant information not only for transport terminals but also for tourist destinations.

Training and awareness - for the framework to be successful, ongoing training and awareness-raising activities of transport staff, technology developers, and users should be ensured. A clear understanding of accessibility principles and how to implement them is crucial for creating truly inclusive transport systems.

Monitoring and evaluation - developed systems should be monitored continuously, evaluated from a PRM perspective and in line with any changes in technology development or legal requirements.

According to the mentioned elements, project partners will implement the DANOVA NEXT application (website) as a smart integrated system (tool) to provide centralized, real-time information that is accessible across different devices. The web application aims to centralise on one place all data needed for seamless journey for 10 transport partners included in the project: 5 airports (DBV, BUD, APM, SIA, IS AIC) 3 urban public transport providers (DPB, CSCC, MoM) and 2 ports (PoK, LUP).

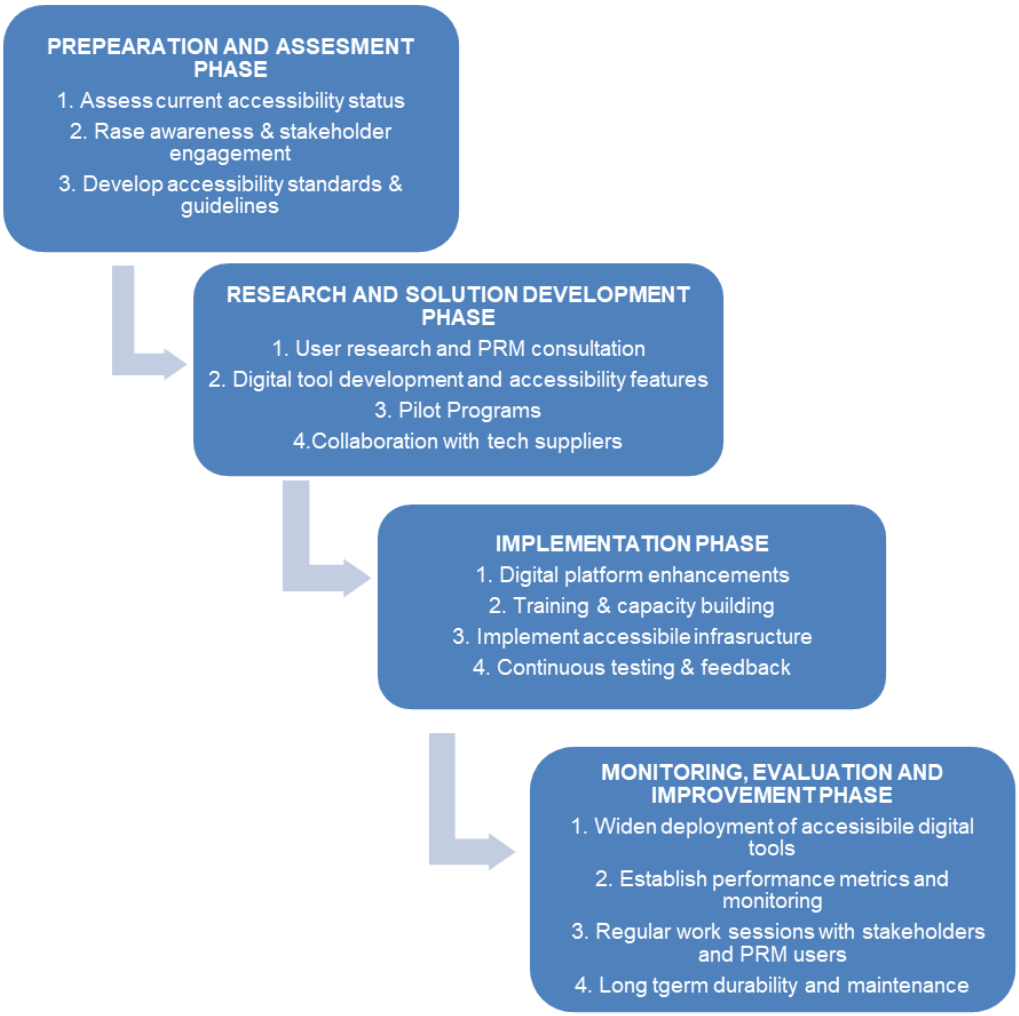
DANOVA NEXT application will be developed jointly by all project partners with crucial and pivotal input done by Target Users partners (SOIH, BSVO, ANSR). Additionally, all transport project partners will perform updates of their respective web pages by introducing PRM-relevant data in accessible format. In previous project deliverables guidelines, features as well as interface requirements by the users have been identified and will be applied in the web application development process. Features that will be included in the web application will include key areas identified in previous project activities: how to book services and assistance for PRM, real-time travel schedule information, layouts of the terminal and accessible terminal infrastructure, destination accessibility maps of urban areas where applicable, procedures for PRM rights, feedback mechanism and other features identified in the process.

5.2. Implementation Road Map

To implement DTIS accessible to PRM, the following road map is proposed to infrastructure service providers and other institutions interested (time for each phase varies on complexity of project to be implemented):

- Preparation and assessment phase - 0-6 months
- Research and solution development phase - 6-12 months
- Implementation - 12-24 months
- Monitoring, evaluation and improvement phase - 24-36 months.

Picture 1. Implementation road map for DTIS



The preparation and assessment phase starts with assessing the current accessibility status of the existing transport infrastructure, services and digital transport to identify gaps in the digital accessibility of data for PRM passengers. In this phase, the essential part is to raise awareness by the involvement of stakeholders and disability advocacy groups users to collect input on best practices and accessibility standards and to develop project scope and future implementation steps. This can be done by organising working groups, workshops and training sessions. The last step in the assessment phase can be the creation of internal accessibility policies and alignment with international digital data accessibility standards such as WACG.

The research and solution development phase starts with identifying PRM users' needs through targeted focus groups and surveys to understand their travel needs and requirements in detail and to collect feedback and identify key features of data to be accessible. Once user needs are identified, the next step is the development of solutions and digital user-friendly tools as well as defining data to be presented on the digital platforms and interface requirement, after which the development of solutions starts and pilot programs are tested. In this phase, it is important to collaborate with technological vendors and service providers that are specialised in such solution and tool development.

In the Implementation phase, it is important to implement accessibility features in existing digital platforms and to integrate other tools and systems that support digital accessibility of data for PRM passengers. Also, enabling communication channels and the necessity to collect feedback from users is essential. During the implementation phase and through the entire project life-cycle, training of personnel to assist PRM should be performed, especially on how to use new technologies effectively (for example, indoor wayfinding navigation system in terminal buildings). Training of the customer care service department should also be performed regularly, as well as users testing to collect feedback on implemented solutions. Besides digital data accessibility, it is important to conduct infrastructure accessibility measures and ensure adequate signage systems and contrast of information panels and displays.

The monitoring, evaluation and improvement phase ensures that implemented solutions are regularly monitored in respect of established performance metrics. In this phase, transport service providers should also maintain regular working sessions with disability advocacy groups and stakeholders to improve their implemented solutions and conduct regular user satisfaction survey analysis. Also, integration to third-party systems where possible is encouraged. Regular maintenance and updating mechanisms shall be ensured to meet new standards and technology advancement.

5.3. COORDINATION MECHANISM AMONG STAKEHOLDERS

As previously identified, engaging different stakeholders in the development of accessibility measures, either infrastructure or digital data provision, is crucial for successful implementation. Therefore, transport service providers and other institutions should develop a Stakeholder engagement and communication strategy to have a unified approach and identify key areas of stakeholder engagement as well as methods for stakeholder coordination.

Most important stakeholders in transport industry in respect of accessibility of digital data and services relate to government bodies and policy makers (transnational, national, regional, local) transport operators and providers, disability advocacy groups or unions, suppliers and service

providers, different travel agencies, clients and customers, PRM users, tenants in transport terminals and local community.

To achieve synergy between different stakeholders, several coordination mechanisms can be implemented:

- Workshop sessions and groups - maintaining regulating workshops sessions and groups from different stakeholders and engagement of PRM users ensures better identification of problems and needs to be addressed and best practices in digital accessible tools identified.
- National / regional forums - engaging different national / regional policy makers and stakeholders ensures a strategic approach to developing common guidelines and best practices in order to make transport and tourist destinations more inclusive and accessible for PRM.
- Institutional or service providers partner agreements - that can enhance passenger seamless journey experience by providing all necessary information and improve intermodal connectivity. Good example is fly&cruise concept to be commonly developed by airlines, airports and ports.
- Data sharing and research collaboration - integration of data from different transport modes is crucial in raising PRM satisfaction and journey experience. Therefore, efforts in providing integrated data should be of primary focus to infrastructure service providers and stakeholders.

Within project DANOVA NEXT several working groups and sessions have already been organized and will be till the project end as well as transnational forums and conferences. Institutional agreements have been finalized through Letter of Intent connecting all 16 partners in one Smart Network with a common goal to share and promote projects results, best practices and lessons learned in order to transfer knowledge to DR and other regions in Europe.

6. CONCLUSION

The DANOVA NEXT project represents a significant step toward enhancing digital accessibility in transport across the Danube Region. By addressing critical challenges related to the availability, accuracy, and standardization of accessibility data, the project has laid the foundation for a harmonized and inclusive transport system. The collaborative efforts of project partners, stakeholders, and PRM users have led to the development of a common framework that ensures equal access to digital travel information for all passengers, regardless of their mobility, visual, or hearing impairments.

One of the most important achievements of this initiative is the establishment of a Smart Transport Network, which integrates various transport modes, facilities, and organizations into a cohesive digital ecosystem. This network facilitates the sharing of standardized accessibility data, ensuring that passengers receive reliable and up-to-date information to navigate transport systems independently. The harmonized framework developed through focus groups, stakeholder engagement, and real-world input from PRM users ensures that digital tools and services are practical, efficient, and user-friendly.

Throughout the document, several key interventions have been identified to improve digital accessibility in transport, including the need for high-quality, standardized accessibility data, real-time travel information, and a stronger focus on user-centered design. The involvement of PRM users in co-creating and refining digital solutions has been a cornerstone of this project, ensuring that the tools developed truly meet their needs. By embedding continuous feedback mechanisms, transport providers can make ongoing improvements to digital services, further strengthening accessibility and inclusion.

The introduction of innovative technologies, such as AI-driven assistance tools, IoT-enabled navigation systems, and voice-controlled interfaces, has the potential to revolutionize transport accessibility. However, technology alone is not enough. Strong stakeholder collaboration, adherence to international accessibility standards, and long-term commitment from policymakers, transport operators, and digital service providers are necessary to sustain and expand these improvements.

The DANOVA NEXT framework is not just a guideline but a starting point for future innovation and policy development. By implementing the recommendations outlined in this document, transport systems can transition toward a fully accessible and inclusive digital landscape. This will not only enhance mobility and independence for PRM users but also create a more efficient, user-friendly, and future-ready transport network for all passengers.

Moving forward, it is essential to maintain momentum, foster cross-border cooperation, and continue adapting to technological advancements. By prioritizing accessibility in digital transport solutions, we can ensure that no passenger is left behind and that the Danube Region sets an example of best practices in universal mobility and transport innovation.

7. RECOMMENDATION FOR FUTURE WORK

Ensuring sustainable digital accessibility in transport requires continuous development, policy alignment, technological adaptation, and user-centered innovation. While the DANOVA NEXT project has established a harmonized framework and a Smart Transport Network, the long-term success of these initiatives depends on further advancements and ongoing collaboration among transport providers, policymakers, technology developers, and PRM user groups. The following recommendations outline essential actions to sustain, improve, and expand digital accessibility in the transport sector across the Danube Region and beyond.

Strengthening Policy and Regulatory Frameworks

A comprehensive policy framework is critical to ensuring that digital accessibility remains a priority for transport authorities and service providers. Future efforts should focus on integrating digital accessibility standards into national and regional transport policies, ensuring compliance with EU accessibility regulations such as the Web Content Accessibility Guidelines (WCAG) and the EN 301 549 standard for digital accessibility in public services. Additionally, mandating the use of standardized accessibility data formats across transport networks will make real-time information universally available and interoperable. Reinforcing legal obligations for transport providers to include accessibility features in all new digital platforms and services, including websites, mobile applications, and ticketing systems, is crucial. To ensure compliance, enforcement mechanisms such as audits and certifications should be established.

Expanding the Smart Transport Network

The Smart Transport Network, established through DANOVA NEXT, should be further expanded and enhanced to foster stronger collaboration between stakeholders, ensuring that digital accessibility improvements remain ongoing. This includes encouraging additional transport providers, technology firms, and advocacy groups to join the network, thus broadening its impact. A centralized digital accessibility hub should be developed where transport authorities can exchange best practices, standardized data models, and user feedback insights. Cross-border partnerships should be established to allow seamless access to digital accessibility information across multiple countries in the Danube Region. Additionally, incentive programs should be introduced for transport operators that actively contribute to accessibility improvements, ensuring long-term engagement.

Enhancing Digital Accessibility Data Collection and Management

The availability of high-quality, real-time accessibility data is essential for reliable digital transport tools. To achieve this, real-time data tracking systems should be implemented to monitor transport infrastructure accessibility, including elevator functionality, step-free access, and alternative routes. Standardizing accessibility data formats across all transport modes will facilitate data sharing and interoperability. Data collection methods should be improved by leveraging IoT-enabled devices, AI-driven analytics, and crowdsourced feedback from PRM users. Establishing regular data validation processes will ensure that accessibility information remains accurate, complete, and up to date.

Promoting the Development and Adoption of Inclusive Digital Tools

Future transport systems should embrace innovative digital solutions that cater to the diverse needs of PRM users. AI-driven virtual assistants should be developed to provide real-time travel guidance through voice commands, chatbots, and predictive analytics. Accessibility-focused navigation systems should be integrated into mobile applications, transport terminals, and websites to ensure that real-time updates on transport disruptions and accessibility routes are available. Digital transport tools should be enhanced by allowing users to customize interfaces, adjust text size and contrast settings, enable voice control, and select preferred notification formats. Increasing the availability of multi-language accessibility features will further ensure inclusivity for non-native speakers and international travelers with disabilities.

Increasing PRM User Involvement in Digital Accessibility Improvements

A user-centered approach is essential for creating truly effective digital tools. To achieve this, transport providers should establish ongoing feedback channels that allow PRM users to report accessibility issues in real time via mobile apps, surveys, and direct communication with transport authorities. Regular focus groups and usability testing sessions should be conducted to ensure that PRM users are actively involved in designing and improving digital tools. Financial incentives or recognition programs should be provided for PRM users who contribute valuable feedback to digital accessibility projects. Encouraging co-creation initiatives, where PRM users collaborate directly with technology developers and transport operators, will ensure that digital tools are designed and refined based on real-world needs.

Improving Awareness and Training on Digital Accessibility

Long-term digital accessibility improvements require capacity building among transport providers, technology developers, and customer service personnel. Mandatory training programs should be developed for transport operators, IT developers, and support staff on digital accessibility standards and inclusive service provision. Digital accessibility training should also be integrated into university and professional courses to ensure that future generations of technology professionals are equipped with knowledge on inclusive design. Public awareness campaigns should be launched to highlight the importance of accessible digital transport solutions, encouraging greater support from decision-makers and funding bodies. Easy-to-understand guidelines should be provided for transport providers to simplify the adoption of digital accessibility best practices.

Establishing Long-Term Monitoring, Evaluation, and Sustainability Plans

To ensure continuous improvement, transport authorities should adopt a structured approach to monitoring and evaluating digital accessibility initiatives. Key Performance Indicators (KPIs) should be developed to measure the success of accessibility initiatives, such as user satisfaction rates, accessibility compliance scores, and service availability metrics. Regular accessibility audits should be conducted to identify areas for improvement and ensure adherence to international standards. Dedicated funding should be allocated for the long-term maintenance and enhancement of digital accessibility tools and services. Periodic updates to digital platforms should be encouraged to ensure compatibility with emerging assistive technologies and evolving user needs.

Facilitating Cross-Sector and International Collaboration

Digital accessibility in transport should be viewed as a collaborative effort that extends beyond national borders. Cross-sector partnerships should be encouraged between transport providers, IT developers, disability advocacy organizations, and policymakers to foster joint innovation. Aligning accessibility efforts with European and global initiatives will ensure that the Danube Region becomes a leading example in transport inclusivity. Funding and investment opportunities should be created to support new accessibility innovations and pilot programs. A platform for knowledge exchange should be developed, where stakeholders can share best practices, research findings, and successful case studies.

Final Thoughts

Ensuring the long-term success of digital accessibility in transport requires ongoing commitment, technological advancements, and user-driven improvements. By implementing these recommendations, transport providers and policymakers can build upon the foundation laid by the DANOVA NEXT project, creating a transport system that is not only technologically advanced but also fully inclusive.

Looking ahead, the future of digital accessibility in transport must be driven by innovation, collaboration, and inclusivity. By making digital tools accessible, reliable, and user-centered, we can empower PRM passengers, enhance travel experiences, and ensure that transport systems in the Danube Region and beyond are truly designed for everyone.