

PUBLIC TRANSPORT ACCESSIBILITY FOR PERSONS WITH DISABILITIES

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Abstract

Accessible public transport is a basic condition for independent living, social participation, education, employment, healthcare access, and community life for persons with disabilities. Despite the expansion of low-floor buses, lifts, tactile paving, accessible stations, and digital travel information, many passengers continue to experience exclusion throughout the journey chain. Barriers may arise while walking to a stop, crossing roads, entering a station, purchasing a ticket, boarding a vehicle, receiving real-time information, changing routes, or seeking assistance during service disruption. This paper examines public transport accessibility from an inclusive mobility perspective and treats accessibility as a continuous service experience rather than a single vehicle feature.

The study uses a descriptive and comparative analytical approach based on disability rights, universal design, and whole-journey accessibility principles. It reviews the main physical, informational, operational, attitudinal, and institutional barriers affecting persons with mobility, visual, hearing, cognitive, and psychosocial disabilities. Particular attention is given to the coordination between pedestrian infrastructure, stops and stations, vehicle design, staff support, accessible communication, and complaint-response systems. The paper also identifies practical measures that transport agencies can use to convert legal accessibility commitments into reliable everyday travel.

The analysis indicates that inclusive transport outcomes depend on integrated planning, regular maintenance, user participation, staff training, and measurable accountability. A step-free bus alone does not ensure accessibility when footpaths are obstructed, ramps are not deployed, announcements are unavailable, or accessible routes are unreliable. Universal design, co-design with persons with disabilities, accessible digital systems, and transparent monitoring can improve safety, dignity, confidence, and equitable access to urban opportunities. The findings support a shift from minimum compliance toward dependable, person-centred public transport systems.

Keywords: Public Transport, Persons with Disabilities, Accessibility, Inclusive Mobility, Universal Design, Whole Journey Chain, Barrier-Free Design, Accessible Information, Paratransit, Social Inclusion

1. INTRODUCTION

Public transport plays a central role in connecting people with work, education, healthcare, markets, public services, family networks, and cultural life. For persons with disabilities, the availability of a route does not necessarily mean that the route is usable. A journey can become inaccessible because of an uneven footpath, an unsafe crossing, a high kerb, a platform gap, unclear signage, a failed lift, inaccessible ticketing, or an operator who is unable to provide appropriate support. Accessibility must therefore be understood as the practical ability to complete a journey safely, independently, affordably, and with dignity. The Convention on the Rights of Persons with Disabilities identifies access to

transportation as an essential requirement for independent living and full participation in society. In this context, accessible public transport is not a special service for a small group of users; it is a public responsibility that supports equality of opportunity. When transport systems are designed for diverse users, they also benefit older persons, children, pregnant passengers, travellers carrying luggage, and people with temporary injuries. Inclusive transport planning therefore contributes to safer, more resilient, and more liveable cities.

A major challenge is that accessibility is often approached as a narrow engineering issue. Authorities may install ramps, designate priority seating, or purchase low-floor

vehicles, while neglecting first- and last-mile access, service reliability, communication needs, and the travel experiences of people with non-visible disabilities. Such fragmented interventions can leave passengers unable to use the system in real conditions. An inclusive approach requires coordination among transport agencies, municipal planners, road authorities, technology providers, operators, and organisations of persons with disabilities. This paper explores the factors that shape public transport accessibility for persons with disabilities. It reviews the legal and conceptual foundation of inclusive mobility, identifies barriers across the whole journey chain, and proposes an analytical framework for assessing accessibility in buses, rail, metro, tram, and feeder systems. The purpose is to support practical planning decisions that enable dependable access rather than occasional or conditional use.

2. LITERATURE REVIEW

Research on disability and transport consistently shows that inaccessible mobility can lead to social exclusion. People may reduce or cancel trips when they expect broken lifts, inaccessible stops, insufficient information, overcrowding, unsafe transfers, long waiting times, or negative treatment from staff and other passengers. Studies also emphasise that barriers are cumulative: a person may be able to board a bus but still be prevented from travelling because the path to the stop is unsafe or the destination cannot be reached after alighting. This has strengthened the use of the whole journey chain as a framework for understanding transport inclusion.

Recent reviews describe public transport accessibility as a multidimensional issue involving the built environment, vehicle design, information systems, service operations, affordability, safety, and attitudes. The literature identifies persistent gaps between formal accessibility standards and day-to-day experience. These gaps are often linked to poor maintenance, limited enforcement, inadequate staff training, inaccessible digital interfaces, and a lack of meaningful consultation with persons with disabilities. Universal design and co-design are consequently presented as key approaches for

improving both technical quality and user confidence.

The literature also indicates that disability is diverse. A design that supports wheelchair users may not adequately meet the needs of blind or low-vision travellers, deaf or hard-of-hearing passengers, persons with intellectual disabilities, or people who experience anxiety, fatigue, or sensory overload. Inclusive public transport must therefore provide multiple ways to access information, navigate spaces, request assistance, and recover from disruption. The central question is not whether a feature exists, but whether it works reliably for different users in ordinary travel conditions.

2.1 CONCEPT OF ACCESSIBILITY IN PUBLIC TRANSPORT

- Accessibility is the ability to plan, reach, enter, use, transfer, and leave services safely.
- The journey chain connects origin, stop, boarding, travel, transfer, alighting, and final destination.
- It includes physical access, understandable information, safety, reliability, affordability, and assistance.
- Universal design enables the widest possible range of people to use services without separate arrangements.

2.2 BARRIERS FACED BY PERSONS WITH DISABILITIES

- Physical barriers include uneven paths, high kerbs, narrow gates, ramps, gaps, toilets, and lifts.
- Information barriers include visual-only announcements, poor signage, missing tactile cues, and inaccessible ticketing.
- Operational barriers include missed stops, unsafe assistance, unavailable vehicles, and unclear disruption plans.
- Attitudinal barriers occur when staff misunderstand disability or provide assistance without consent.

2.3 RIGHTS-BASED AND UNIVERSAL DESIGN APPROACH

- A rights-based approach treats accessibility as an equality obligation, not a welfare benefit.
- Universal design supports step-free routes, low-floor boarding, tactile cues, clear wayfinding, and usable ticketing.

- Direct consultation with persons with disabilities improves standards, services, digital tools, and staff training.
- Monitoring should measure reliable use in real conditions, not only the presence of equipment.

3. OBJECT OF STUDY

The present study focuses on the accessibility of public transport for persons with disabilities across the complete travel chain. It examines how environmental design, vehicle features, information systems, staff practices, and institutional arrangements influence the ability of a passenger to plan and complete a journey. The analysis does not treat disability as a

single category; instead, it considers the varied requirements associated with mobility, sensory, cognitive, communication, and psychosocial disabilities.

The study uses an inclusive mobility framework to compare the major accessibility dimensions of public transport. The framework recognises that successful access depends on the interaction between public streets, stops and stations, vehicles, digital and non-digital information, operating staff, and response mechanisms. The table below presents the principal dimensions considered in the assessment.

3.1 ACCESSIBILITY DIMENSIONS CONSIDERED

S.No.	Accessibility Dimension	Common Barrier	Inclusive Design Requirement	Expected Benefit
1	Pedestrian approach and stops	Uneven paths, high kerbs, poor crossings	Continuous step-free paths, dropped kerbs, seating, tactile cues	Safe access to boarding points
2	Vehicles and boarding	High steps, gaps, inaccessible ramps	Low floors, working ramps or lifts, priority spaces	Independent and dignified boarding
3	Travel information	Visual-only or complex information	Audio-visual announcements, tactile maps, plain language	Confident route planning and navigation
4	Operations and staff support	Inconsistent assistance and poor attitudes	Disability awareness, standard procedures, accountability	Reliable service experience
5	Interchange and disruption	Broken lifts, unclear diversions, unsafe transfers	Accessible alternatives, real-time alerts, assistance points	Continuity throughout the journey

3.2 STUDY OBJECTIVES

- To examine the principal barriers that restrict public transport use by persons with disabilities.
- To analyse accessibility across the whole journey chain rather than at a single point of travel.
- To compare physical, informational, operational, attitudinal, and institutional accessibility requirements.
- To identify universal design and service-management measures that improve independent mobility.

- To develop a practical framework for inclusive public transport assessment and policy planning.

4. RESEARCH METHODOLOGY

The study adopts a descriptive and comparative research methodology. It is based on a structured review of disability rights principles, universal design guidance, accessibility literature, and public transport practice. This approach is appropriate because the research examines the relationship between transport-system features and inclusive travel outcomes rather than testing a single engineering intervention. The methodology

focuses on identifying recurring barriers and translating them into assessment criteria.

The analysis applies a whole-journey perspective. Each stage of travel is considered in relation to different passenger needs, including wheelchair users, persons with visual or hearing impairments, people with cognitive or communication disabilities, and travellers who require additional time, guidance, or predictable service conditions. The framework is designed to support comparative evaluation of buses, rail systems, metro services, tram networks, and their surrounding pedestrian environments.

4.1 RESEARCH DESIGN

- The study follows a descriptive, qualitative, and comparative research design.
- A rights-based and universal design perspective guides the assessment of accessibility.
- The unit of analysis is the complete public transport journey, from origin to destination.
- The findings are interpreted through the experiences and functional needs of diverse passengers.

4.2 ANALYTICAL FRAMEWORK

- Physical accessibility: pedestrian routes, stops, stations, boarding areas, vehicles, and transfer spaces.
- Information accessibility: route maps, signs, announcements, websites, mobile applications, and emergency messages.
- Operational accessibility: service frequency, assistance practices, maintenance, disruption management, and complaint handling.
- Social accessibility: staff attitudes, passenger behaviour, perceived safety, affordability, and respectful treatment.

4.3 STUDY ELEMENTS

- Public streets, crossings, sidewalks, and feeder paths leading to transport stops and stations.
- Bus, rail, metro, tram, and interchange facilities that form part of a normal passenger journey.
- Printed, audible, tactile, digital, and real-time information supplied before and during travel.

- Policies, staff procedures, maintenance arrangements, and participation mechanisms used by transport agencies.

4.4 PARAMETERS OF ANALYSIS

The following parameters are assessed to understand accessible public transport performance:

- Continuity and safety of the pedestrian approach to stops and stations
- Availability and usability of step-free boarding and internal vehicle space
- Clarity, timeliness, and multi-sensory accessibility of travel information
- Reliability of lifts, ramps, tactile indicators, seating, and accessible toilets
- Availability of trained staff and respectful assistance procedures
- Ability to complete transfers and manage service disruptions without exclusion

4.5 PROCEDURE OF STUDY

- Review of legal, policy, and research literature on disability inclusion and public transport accessibility
- Identification of barriers affecting each stage of the whole journey chain
- Classification of barriers into physical, informational, operational, attitudinal, and institutional categories
- Comparison of universal design requirements with common public transport practices
- Interpretation of accessibility gaps in relation to independence, safety, dignity, and participation
- Development of practical recommendations for inclusive mobility planning and service delivery

4.6 ANALYTICAL APPROACH

- Comparative assessment of accessibility dimensions through a structured framework
- Interpretation of barriers from the perspective of diverse disability-related access requirements
- Linking service-design features with likely travel outcomes and participation opportunities
- Identification of priority measures for transport agencies, municipalities, and policy makers

5. DATA ANALYSIS

The analysis indicates that accessibility problems rarely occur in isolation. A

passenger may encounter an accessible bus but be unable to reach the bus stop because of parked vehicles, missing kerb ramps, poor lighting, or an unsafe road crossing. Similarly, a step-free station may remain difficult to use when ticket machines are inaccessible, platform signs are unclear, or lift failures are not communicated in advance. These examples show that the effectiveness of accessibility measures depends on continuity across the journey rather than on a single facility or technology.

Physical accessibility is most visible, but it is not sufficient on its own. Low-floor buses, ramps, tactile paving, accessible toilets, priority seating, and lifts are important because they reduce direct environmental barriers. However, these features must be maintained and consistently available. Equipment that is present but out of service can create greater uncertainty than a known barrier because passengers cannot plan with confidence. Routine inspections and publicly available service-status information are therefore essential elements of accessible operations.

Information accessibility is equally significant. Passengers need route, fare, stop, platform, and disruption information in formats that they can understand and use. Visual displays should be supplemented by audible announcements; audio-only messages should be supported by clear visual information; and digital services should follow accessible design principles. Plain language, high contrast, readable fonts, logical wayfinding, tactile indicators, and accessible mobile applications help passengers make decisions before and during travel. These features are particularly important during transfers and unexpected service changes.

Operational and attitudinal factors strongly influence whether technical accessibility works in practice. Drivers, station staff, security personnel, and customer-service teams may need to deploy ramps, provide accurate information, manage crowding, and respond to requests for assistance. Training should be practical and rights-based, emphasising respectful communication, consent before providing assistance, and awareness that not all disabilities are visible. Clear escalation procedures are also necessary

when lifts fail, vehicles cannot accommodate a passenger, or a service is diverted.

The analysis further shows that persons with disabilities should participate directly in planning, testing, and monitoring. Co-design sessions, access audits, user trials, complaint analysis, and independent advisory groups can reveal barriers that standard technical inspections may miss. Such participation improves the quality of infrastructure and helps agencies understand how accessibility failures affect time, cost, safety, and confidence. It also promotes accountability by connecting policy commitments with the actual experiences of passengers.

6. DISCUSSION

The findings underline that public transport accessibility is a system property. It cannot be achieved solely through vehicle procurement or isolated station upgrades. A network becomes inclusive when streets, stops, stations, vehicles, communications, service operations, and staff practices work together. This requires agencies to coordinate with local authorities responsible for footpaths, crossings, street furniture, lighting, drainage, and land-use planning. Fragmented responsibility is one of the main reasons why accessible components do not always form an accessible journey.

Universal design provides a strong foundation because it reduces the need for passengers to request exceptions or depend on special arrangements. Step-free routes, low-floor vehicles, multi-sensory information, predictable layouts, simple ticketing, and accessible digital platforms can be used by many people without additional barriers. Nevertheless, universal design should not be interpreted as a one-size-fits-all solution. Some passengers will continue to require personal assistance, accessible taxis, or flexible demand-responsive services. Inclusive networks must combine mainstream accessibility with reliable complementary options.

The discussion also highlights the importance of reliability. A lift that is frequently out of service, a ramp that a driver does not deploy, or an inaccessible diversion can make a route unusable even when the network appears compliant on paper. Agencies should therefore publish accessibility performance indicators,

such as lift uptime, ramp deployment, accessible-trip completion, information accuracy, response times, and unresolved complaints. These indicators should be reviewed with organisations of persons with disabilities and used to guide maintenance, investment, and staff-development priorities.

Accessible transport also has wider social and economic value. When people can travel independently, they are better able to participate in employment, education, health services, civic activity, and social relationships. Improved accessibility can reduce dependence on costly individual travel arrangements and create more equitable access to city opportunities. For these reasons, public transport accessibility should be embedded in climate, sustainability, urban-development, and social-inclusion strategies rather than treated as a separate compliance programme.

7. CONCLUSION

This study examined public transport accessibility for persons with disabilities through an inclusive mobility and whole-journey framework. It showed that accessible travel depends on much more than the presence of ramps, lifts, or designated seating. A successful journey requires continuous step-free access, safe pedestrian routes, usable vehicles, accessible information, trained staff,

dependable operations, and effective responses to disruption. When any one of these components fails, the passenger may be excluded from the service.

The analysis confirms that physical, informational, operational, attitudinal, and institutional barriers must be addressed together. Universal design can improve usability for a wide range of passengers, while co-design with persons with disabilities helps ensure that services respond to real travel conditions. Transport agencies should move beyond minimum standards by adopting measurable accessibility targets, transparent maintenance practices, accessible digital systems, disability-awareness training, and regular independent access audits.

Inclusive public transport is a matter of rights, equity, and sustainable urban development. By planning around diverse users from the earliest stages of design and by maintaining accessibility throughout daily operations, cities can create transport systems that are safer, more reliable, and more welcoming for everyone. Future research may extend this framework through passenger surveys, accessibility audits, route-level studies, and comparative analysis of urban and rural transport systems.

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