The Hidden Barrier in Transportation: Why Your Kiosks May Be Leaving Travelers Behind

A Strategic Guide to Multimodal Accessibility in Transportation Systems

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Public transit and travel infrastructure are evolving, and so are the expectations of travelers across ground and air systems. In an age of contactless journeys and digital-first travel experiences, self-service technology has become a cornerstone of modern mobility.

Among these are kiosks, including ticketing machines, payment stations, check-in terminals, information screens, and automated gates. Devices that play a central role in how travelers navigate both ground and air transportation networks. Yet, despite their convenience, these interfaces often fall short in terms of accessibility.

The truth is that most transportation kiosks, especially those relying solely on touchscreens, were not designed with all travelers in mind, including people with disabilities.

This white paper explores the overlooked barriers that self-service kiosks and devices present to travelers with disabilities, older adults, foreign-language speakers, and anyone navigating real-world conditions like glare, noise, or high-stress conditions.

It offers a practical framework for public entities and private-sector operators to adopt **multimodal design**. This approach supports multiple ways of interacting with kiosks, without requiring the scrapping or replacement of their entire infrastructure.

Mobility providers that proactively embrace inclusive design will not only enhance traveler experiences but also mitigate compliance risks, reduce support costs, and position themselves as leaders in the future of accessible transit.

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Why Today's Kiosks Leave Travelers Behind

Self-service kiosk devices were designed with speed, convenience, and cost savings in mind. They serve as a digital gateway to public services that align with the rise of contactless travel. However, while technology has succeeded in reducing friction for many, it has also introduced new obstacles and barriers for those who don't navigate the world in standard ways.

The problem lies in the assumptions embedded in their design. Most kiosks operate on the belief that all travelers can (and want to) interact with a touchscreen in the same way, under the same conditions. But that assumption rarely holds true.

In real-world transportation environments, the conditions under which kiosks operate are anything but ideal. Glare from sunlight can make screens unreadable outdoors. Loud ambient noise can obscure any audio guidance.

Cold weather or tactile impairment can make touchscreens difficult to use, especially for passengers wearing gloves or using mobility aids. People may be operating kiosks with limited time before they catch a flight or train, adding to the stress of trying to complete tasks quickly without making mistakes.

For travelers who are blind or have low vision, touch-only interfaces with no tactile or audio alternatives create complete access barriers. Even the structure and language of the user interface can become an obstacle for people with cognitive disabilities or those navigating in a second language.

These barriers are not marginal issues; they fundamentally undermine travelers' ability to complete tasks independently and equitably. When kiosks are inaccessible, the result is not just a poor user experience, but exclusion.

Exclusion in transportation systems isn't theoretical. It plays out in real, measurable ways. Exclusion means missed transfers, rerouted journeys, or an inability to purchase a ticket without assistance. For travelers who already face physical, sensory, or cognitive challenges, these moments aren't rare exceptions. They are routine disruptions that chip away at autonomy and trust.

When a transportation system embeds inaccessibility into its core infrastructure (however unintentionally), it imposes an extra burden on precisely the travelers who depend on it most. And in doing so, it creates not only operational friction but also systemic inequity.

> "Today's airport kiosks need to do more than speed up check-in. They need to serve everyone. At ImageHOLDERS, we design kiosk enclosures that integrate assistive technology like voice activation and gesture control to support passengers with a wide range of needs. Accessibility is not an afterthought - it's at the forefront of our design process."
>
> — **FREYA STOREY**
> Marketing Manager, ImageHOLDERS

Hidden Operational Costs

The impact of inaccessible kiosks doesn't stop at a single failed interaction; it ripples across the entire transportation system. When self-service terminals fail to accommodate all users, the downstream effects show up in call center volumes, staffing demands, and operational inefficiencies.

Support teams are forced to intervene more frequently. Travelers spend more time waiting or rerouting. And the intended benefits of automation (speed, independence, and cost reduction) are steadily eroded.

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These inefficiencies carry real financial weight. Each diverted interaction or manual override adds soft costs that accumulate across thousands of kiosks and millions of traveler engagements. Over time, those hidden expenses can rival (or even exceed) the investment required to build accessibility from the start.

Beyond internal costs, the external consequences are just as real. Public sentiment around transportation accessibility increasingly hinges on digital usability. A kiosk that confuses or excludes can quickly become a flashpoint, not just for complaints but for litigation.

Inaccessible kiosks don't just frustrate users; they create structural barriers to independent travel for people with disabilities. This reinforces patterns of exclusion that have historically marginalized these travelers, despite the existence of inclusive technology that could improve autonomy and usability for many.

As enforcement of accessibility regulations intensifies worldwide, the legal and reputational risks of inaccessible design are no longer theoretical.

The Compliance Landscape Is Evolving, and Kiosks Are Squarely in the Frame

FROM MINIMUM VIABLE COMPLIANCE TO MEANINGFUL ACCESSIBILITY

In the regulatory landscape surrounding accessibility, self-service kiosks are no longer a gray area. They are now clearly recognized as covered interfaces under multiple legal frameworks.

In the U.S., **Title II of the Americans with Disabilities Act (ADA)** and **Section 504 of the Rehabilitation Act** require public entities (including transportation authorities) to ensure that all services, including digital interfaces, are accessible to people with disabilities.

For transportation providers operating in airports, the **Air Carrier Access Act (ACAA)** applies similar mandates, requiring airlines and their contractors to ensure that any automated kiosks provided for passenger use (such as check-in or boarding) meet federal accessibility requirements.

For organizations receiving federal funding or engaging in federal procurement, **Section 508** adds further obligations. Section 508 provides accessibility requirements for software and hardware systems used in public-facing infrastructure, including kiosks. Compliance here is not optional; it's contractual.

Globally, the regulatory pressure is escalating. The **European Accessibility Act (EAA)**, which has **now taken effect**, broadens the scope of digital accessibility mandates to include private-sector service providers and device manufacturers. The EAA's focus also includes self-service terminals in transportation environments.

Under the EAA, failure to ensure accessibility won't just create a poor traveler experience. It could also mean losing access to public contracts or facing formal sanctions across the EU.

What ties these diverse regulations together is their increasing alignment with the **Web Content Accessibility Guidelines (WCAG)** and international standards, such as **EN 301 549**, which provides explicit criteria for information and communication technology (ICT) with display screens and software-based user interfaces.

These standards address everything from contrast and keyboard navigation to screen reader compatibility and timeouts, and they are enforceable. For transportation authorities and kiosk vendors, the message is clear: accessibility is no longer a feature. It is a legal and design imperative.

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What Is Multimodal Design and Why Transportation Needs It Now

Kiosks were originally introduced as self-service convenience points, many of which were tactilely operable, similar to ATMs. Over time, the shift toward touchscreen-only interfaces has narrowed their accessibility, leaving less flexibility for travelers who need alternative ways to interact in fast-paced, unpredictable environments.

Multimodal design represents a foundational rethinking of how people interact with self-service technology, particularly in high-pressure, public settings such as transportation.

WHAT MULTIMODAL DESIGN MEANS

Multimodal design refers to systems that support multiple input and output methods, enabling users with a wide range of abilities and situational needs to access, navigate, and complete tasks using the modality that works best for them.

This isn't an add-on or accommodation. Multimodal design is a foundational approach to interface design that anticipates variability in users, environments, and the ways people navigate public systems.

Input Modalities:

- **Tactile buttons:** Tactilely discernible and operable buttons make it easier for blind and low-vision users to navigate and operate functionality, as well as people who find touchscreens difficult to reach and use due to limited dexterity or strength.

- **Tap-to-pair mobile access:** Allows users to initiate and control kiosk interactions via personal devices, minimizing the need to touch shared screens.

- **Voice commands:** Essential in situations where hands-free interaction is preferred or necessary, such as when travelers are carrying luggage, pushing strollers, or managing mobility aids.

Output Modalities:

- **Screen reader integration:** Enables blind users to access on-screen content and available options, such as speech.

- **Audio cues and guidance:** Useful as a supplement to visual notifications and alerts, but can be drowned out in noisy environments, like train stations.

- **Multilingual visual/text displays:** Essential in transit hubs and terminals serving international populations, ensuring clarity across language barriers.

- **Haptic feedback:** Tactile signals that provide confirmation of successful actions (e.g., a vibration when a button is pressed).

> "Public kiosks aren't always used in ideal conditions. That's why we engineer tactile input devices that work reliably in high-traffic, unattended environments. With decades of combined experience, our team brings deep expertise in both assistive technology and the real-world challenges faced by individuals with disabilities. Every product we create is certified by end-users, ensuring it delivers real-world impact where it matters most."
>
> — **NICKY SHAW,** US Operations Manager, Storm Interface

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Why Public Transportation and Travel Systems Are Uniquely Suited and Uniquely Challenged

Transportation environments are not controlled offices or retail spaces. They are unpredictable, time-sensitive, and often chaotic. Lighting conditions shift, noise levels spike, passengers are often rushed or distracted, and the population is diverse in ability, language, and familiarity with the system.

Multimodal kiosks:

- **Accelerate interaction speed.** Offer users the method that is most intuitive or efficient for them.

- **Improve independence and dignity.** Allow more users to complete transactions without needing assistance.

- **Enable compliance by design,** rather than retroactive fixes.

- **Provide redundancy.** If one modality fails or becomes inaccessible, another is available for users who can access it.

In essence, multimodal accessibility can act as the baseline for systems serving the public in dynamic, high-stakes environments.

> "Transit environments demand more than just functionality; they demand resilience. Our outdoor kiosks are engineered to perform year-round, from snow in the Rockies to summer heat in Phoenix. With anti-glare screens, integrated temperature control, and ADA-compliant design, we build for visibility, durability, and inclusive service in every setting."
>
> — **JEREMY DUPONT**
> VP of Product & Marketing,
> KIOSK Information Systems

From Pilot Programs to Policy: How to Scale Multimodal Design

THE PROBLEM WITH 'PILOT PARALYSIS'

Transit authorities have long recognized the need for more accessible kiosk systems, and many have responded with well-intentioned pilot programs. These initiatives often yield promising results, including higher task completion rates, improved traveler satisfaction, and reduced staff interventions. But too often, the lessons learned from these studies remain siloed, and the systems themselves are never scaled beyond a handful of stations or limited test cases.

This disconnect, between small-scale innovation and system-wide integration, is what creates "pilot paralysis." Pilot paralysis occurs when promising accessibility improvements are repeatedly tested in isolation but never adopted at scale, leaving core systems unchanged and inequities unaddressed.

The value of these efforts is clear, but without clear procurement guidelines, performance expectations, or internal champions, the insights from pilot programs stall before becoming operational policy.

To make multimodal accessibility sustainable, agencies need to do more than test new ideas. They need to institutionalize inclusive design, embedding it into procurement processes, vendor accountability frameworks, and long-term technology planning.

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The following best practices provide a roadmap for turning short-term pilots into enduring standards.

Best Practices for Institutionalizing Accessibility

1   **TEST IN LIVE ENVIRONMENTS WITH REAL USERS**

Accessibility cannot be confirmed in a quiet office setting. Transportation systems must conduct evaluations in busy stations, terminals, and outdoor locations with real users, including people with disabilities, seniors, and non-native English speakers. Task success, error rates, and qualitative feedback should guide design iteration.

2   **ENGAGE DISABLED PEOPLE EARLY AND CONTINUOUSLY**

Co-design with diverse groups representing people who will actually use the system. Focus groups and advisory panels are useful for informing design decisions. Still, they need to be supplemented with methods that provide feedback on designs, such as hands-on usability testing with people with disabilities. Inclusion must be an integral part of the design process, from ideation to development and testing.

3   **WRITE ACCESSIBILITY PERFORMANCE INTO CONTRACTS**

Contracts should define **measurable accessibility outcomes,** including:
- Compatibility with screen readers and assistive devices
- Success rate for task completion among diverse user groups
- Multimodal interface support as a core requirement
- Field test results as a precondition for deployment

Entities that take this approach shift the burden from end-users to suppliers of software and hardware integrated into the kiosk, where it belongs.

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Future-Proofing Strategy: Designing for Durability in a Changing Regulatory and Technological Landscape

Accessibility is not static, and neither is the regulatory environment that governs it. As new standards emerge, technologies evolve, and traveler expectations continue to rise, transportation authorities and kiosk vendors must adopt a long-term perspective. True accessibility leadership requires building not just for compliance today, but also embedding a culture and practice of accessibility to cater to adaptability tomorrow.

That means **shifting from a reactive mindset** (where fixes are made in response to lawsuits, complaints, or funding gaps) **to a proactive, systems-level approach to accessibility**.

The goal is not just to comply with current rules, but to design platforms that can evolve in response to future regulations, tools, and user needs, and to ensure an organizational capacity to deliver accessibility that is sustainable over time.

STEP 1:
Conduct a Comprehensive Current State Review

The first step in future-proofing is knowing where you stand. Transportation authorities should begin with a multidimensional review of the current state, which extends beyond kiosk hardware and software. This assessment should evaluate both whether the kiosks themselves meet accessibility benchmarks and the extent to which the organization as a whole is positioned to sustain and grow its accessibility practices.

> *Questions to Guide the Kiosk Audit*
> - Are users consistently abandoning interactions at certain terminals?
> - Are support requests clustering around specific interfaces or locations?
> - How are users with disabilities experiencing the system?
> - Do environmental factors (lighting, noise, crowding) disproportionately impact usability at specific sites?

The kiosk accessibility audit should evaluate both:

- **Technical Accessibility:** e.g., screen reader compatibility, touch target sizes, color contrast.
- **Experiential Accessibility:** e.g., task success rates and pain points experienced by users of a range of disabilities, environmental adaptability.

In parallel with reviewing kiosk accessibility, evaluating the current organizational accessibility maturity helps establish the capacity to deliver and maintain accessible products and services over time. It is an area of strategic focus for advancing accessibility maturity.

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Questions to Guide the Organizational Readiness Audit

- Does the organization have an accessibility policy or other organizational commitment to accessibility?
- Does the organization have internal accessibility champions or dedicated accessibility teams?
- Are processes in place for incorporating accessibility into the specification, design, and development of digital products and services? If so, to what extent are they followed?
- Are procurement and RFP processes aligned to prioritize accessibility outcomes?
- Are customer support, design, and IT teams trained in digital accessibility principles?
- Are there ongoing partnerships with the disability community for testing and feedback?
- Is there a roadmap or budget allocation for scaling accessibility beyond compliance minimums?

A mature organization isn't just aware of its current gaps; it's actively building the capacity and culture to address them long-term.

When transit authorities audit both the system and themselves, they can more accurately prioritize improvements that will have a lasting impact, both in user experience and organizational resilience.

STEP 2:
Prioritize High-Leverage Upgrades

Not all kiosks need to be overhauled at the same time. Instead, entities should prioritize updates based on usage patterns, user vulnerability, and reputational or legal exposure.

Outdoor or high-traffic locations (where environmental factors are most disruptive) are ideal starting points. Similarly, systems with outdated operating systems, single-modality input, or no support for screen readers or tactile navigation are also problematic.

In particular, routes or locations serving senior populations, tourists, or high numbers of low-income travelers are critical for early attention, as these groups are statistically more likely to encounter accessibility barriers and less likely to recover from a failed interaction.

STEP 3:
Make the Business Case, Internally and Externally

For accessibility initiatives to gain traction, they must be tied to tangible business outcomes. Internally, enhancements reduce support and training costs by allowing more users to self-serve successfully. They also contribute to operational efficiency by reducing transaction friction and improving throughput.

Externally, accessible systems open doors to public funding, regulatory approvals, and expanded travelership. They can help position an agency as a leader in digital equity and civic innovation, particularly as government contracts and grants increasingly require demonstrated accessibility performance.

The ability to demonstrate that kiosks meet WCAG 2.1 and EN 301 549 standards is rapidly becoming a table-stakes requirement for winning bids in the public transportation sector.

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MARKETING ACCESSIBILITY AS A DIFFERENTIATOR

Beyond operational and compliance benefits, promoting accessible kiosk design also yields significant brand equity. For transportation authorities, airports, and private mobility providers, visibly inclusive infrastructure signals a commitment to equity, innovation, and customer service.

This makes accessible kiosks **marketing assets**, enabling organizations to showcase digital inclusion in RFPs, press coverage, and public campaigns. In a competitive funding and service environment, goodwill value matters: it builds trust with communities, strengthens public perception, and reinforces leadership in digital equity.

STEP 4:

Architect for Change

Perhaps the most overlooked (and most important) step in futureproofing is designing for modularity and flexibility. Kiosk systems built as tightly coupled, monolithic applications are difficult and costly to update, especially when the system's interface, inputs, and assistive tech hooks are all hard-coded into a single, inflexible platform.

But systems built on modular architecture allow entities to roll out new features, fix accessibility bugs, or integrate emerging technologies (such as mobile handoffs or AI-driven personalization) without replacing the entire system.

This flexibility is critical in a world where standards are evolving, assistive technologies are diversifying, and expectations are moving toward measurable outcomes rather than checkbox compliance.

Long-term resilience comes from scalable architecture and organizational capacity, not from anticipating every edge case, but from being ready to respond when change comes.

Designing for Accessibility Starts at the Interface

Public transportation is more than a convenience; it is a public good. And as society becomes increasingly digital, the quality of a traveler's experience is shaped not just by buses, planes, and trains, but by screens, buttons, prompts, and pathways.

For many people, especially those with accessibility needs, a kiosk can be the difference between using the system independently or being shut out entirely.

When that gate is locked by design choices that exclude, the cost isn't just personal. It affects the entire system, resulting in missed trips, reputational harm, regulatory risk, and a loss of public trust.

But it doesn't have to be this way.

Multimodal accessibility provides a more effective path forward. One where **flexibility replaces rigidity**, where **usability is built into the foundation**, and where **technology serves the many, not the few**.

Kiosks that support multiple modes of interaction aren't just more compliant. They're more resilient. More efficient. More dignified.

And perhaps most importantly, they are more aligned with what public transportation and travel infrastructure should be: a system designed to move people forward (all people) regardless of ability, context, or device.

Transit authorities and technology partners that act now to embrace multimodal design will not only meet today's standards, but they will also help set tomorrow's. They will show that access is not an accommodation, but a principle. Not a requirement, but a responsibility. And not a burden, but an opportunity to lead.

> "Accessibility and speed don't have to be at odds. At Olea, we design travel kiosks that combine secure biometric authentication, thinking about an accessible UX, reducing wait times while supporting users of all abilities. We believe great design makes travel easier for everyone, not just the average traveler."
>
> — **FRANK OLEA,** CEO, Olea Kiosks

TPGi's Role in the Multimodal Transition

TPGi supports organizations that are responsible for (or accountable to) digital accessibility in complex environments like transportation systems. Our work focuses on helping entities assess risk, identify gaps, and meet regulatory expectations with clarity and confidence.

Our services include:

- **Expert audits** of existing kiosk software for accessibility gaps
- **Prototyping and co-design** support with leading kiosk vendors and integrators
- **Field usability testing** with people with disabilities and diverse traveler populations

- **Strategic consulting** to embed accessibility in organizational culture and practice, in RFPs and procurement processes, and in building capacity to deliver accessible digital products and services over time

Ready to make your transportation kiosks more inclusive, efficient, and future-ready?

Partner with TPGi to evaluate your current kiosk infrastructure and chart a clear path toward scalable, kiosk accessibility, before access becomes an obstacle.

TPGi is trusted by leading government agencies, transportation authorities, and enterprise vendors to navigate digital accessibility with precision and accuracy.

Schedule a consultation to speak with our accessibility experts to evaluate your kiosk infrastructure and start building a roadmap for user-friendly, multimodal access.

ABOUT IMAGEHOLDERS:

imageHOLDERS is a design-led manufacturer of self-service kiosks and terminals. Our mission is to create user-centric, fully accessible solutions that offer intuitive and automated user journeys. Collaborating with our partners and clients from concept to completion, our digital solutions help companies drive revenue and improve efficiency, providing seamless customer journeys. Enabling and empowering employees and consumers alike, we aim to solve the self-service challenges of organizations around the world with innovative design and exemplary service.

For more information on imageHOLDERS, please contact Sales at sales@imageholders.com

ABOUT KIOSK INFORMATION SYSTEMS

KIOSK provides self-service automation solutions to increase operational and cost efficiencies, while enhancing the customer experience. With more than 30 years of experience and over 300,000 kiosks deployed, the company is a trusted digital transformation partner for Top 100 Retailers, Fortune 500, and Government clients. KIOSK's parent company is Posiflex Technology, Inc., a global leader in POS solution design and manufacturing which brings global strength and solutions also to KIOSK's product portfolio. KIOSK holds ISO9001:2015 / ISO14001:2015 Quality and Environmental Certifications and delivers proven expertise in design engineering and manufacturing, application development, integration, and comprehensive support services. An innovative portfolio of self-service solutions paired with managed services and IoT capabilities ensure a seamless user experience.

To learn more, visit kiosk.com

ABOUT OLEA KIOSKS

Olea Kiosks® Inc., is a self-service kiosk solution provider for government, healthcare, hospitality, travel, and entertainment. Its technologically advanced, in-house manufacturing, design, and innovation have made it an industry leader. Headquartered in Los Angeles, California, customers include Cincinnati Children's Hospital, Greyhound, Johns Hopkins, Kaiser Permanente, SmarteCarte, Subway Sandwiches, and Universal Studios. Olea Kiosks can be found wherever high-volume authentications and transactions are required, including 50+ major airports, amusement parks, and premier stadiums across all 5 major U.S. sports leagues.

For more information, visit olea.com.

ABOUT STORM INTERFACE:

Storm Interface is the number one trusted partner for publicly accessible self-service solutions. With nearly 40 years of manufacturing expertise and over two decades dedicated to self-service accessibility, we're more than just a technology provider, we're pioneers in accessible self-service. Since 1986, we've been engineering solutions that don't just meet standards, but set them; helping businesses create seamless, accessible experiences for all. Start your accessibility journey with us today. For more information, please contact sales@storm-interface.com.

ABOUT US:

Vispero® is the global leader in assistive technology products for those with vision impairments. All Vispero's brands have a long history of innovation for customers with accessibility needs. Our product portfolio is considered one of the most diverse and reliable on the market. It includes JAWS for Windows, the global leader in screen reading software. For more information, visit www.vispero.com.

TPGi®, a Vispero® company, provides digital accessibility software and services to help businesses reduce risk, grow revenue, and improve user experience. With over 20 years of experience and 21 employees actively influencing accessibility standards on the World Wide Web Consortium (W3C), TPGi offers the most robust knowledge base and accessibility expertise in the industry and award-winning self-service kiosk software. Our tailored approach has enabled 1,000+ customers to achieve the best outcomes for their businesses, employees, and consumers. Trust the experts to guide your accessibility journey. For more information, visit www.tpgi.com.
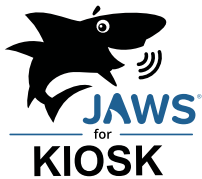
JAWS for Kiosk brings the power of the world's most widely used screen reader to interactive terminals in public spaces, enabling blind and low-vision users to independently navigate, read, and complete tasks. Supports independent self-service experiences across transportation, healthcare, government, retail, and more. JAWS for Kiosk integrates seamlessly with touchscreen kiosks and supports speech, Braille, and tactile input.It's fully customizable, WCAG-, EAA-, and ADA-aligned, and proven to improve accessibility outcomes while reducing the need for staff intervention. For more information, visit www.tpgi.com/accessibility-solutions/jaws-kiosk/.