The Rise of Ticketless Travel

Reimagining access and the role of digital authorisation in global mobility

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Transport networks are undergoing a significant transformation, shaped by population growth, urbanisation and evolving expectations around digital convenience.

Ticketless travel, driven by digital authorisation technologies and advances such as mobile devices, QR codes, and biometrics, has emerged as a key area of innovation within transport networks.

While these developments promise increased efficiency and user satisfaction, they also raise complex questions around data ethics, infrastructure resilience, and inclusive access.

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As passenger mobility is expected to increase two- to three-fold by 2050, traditional systems are under growing pressure. Technological solutions must not only be smart, but equitable, secure, seamless and future proof.

Drawing on expert forecasts and global case studies, including the Metro Barcelona project, this paper explores how transport systems can responsibly transition toward a digital-first model that benefits all stakeholders.

Integrating Future Rail Insights

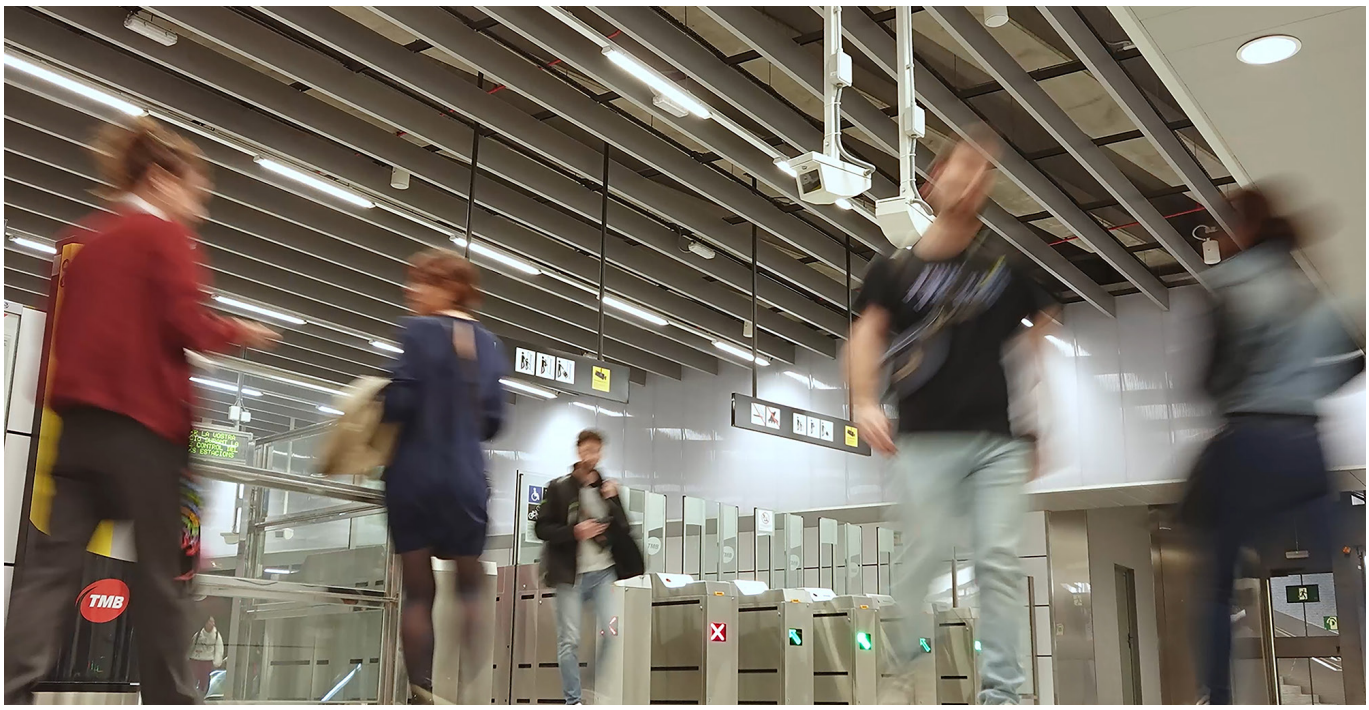
With foresight from the future of rail 2050, a panoramic view of the forces reshaping rail and mobility, global megatrends - ranging from climate stress to ageing populations and rapid tech convergence - will demand new approaches to how journeys are designed and managed.

It stresses the need for holistic mobility ecosystems, where transport experiences are no longer seen as segmented services, but as a unified experience from end to end.

Future mobility networks will need to be interoperable, intuitive, and resilient. Seamless journeys will depend on systems that share data, communicate with each other, and prioritise the needs of diverse passenger groups. This is with no compromise to security, style or comfort.

Real-time information, personalisation and adaptive access will become standard expectations, placing new demands on the design and integration of entrance control and ticketing systems.

The move toward integrated mobility requires more sophisticated data-sharing models. A coordinated approach between different transit operators, technology vendors, and city authorities is essential.



Metro Barcelona's Ernest Lluch station was designed from the outset to integrate advanced ticketless infrastructure

Without universal standards or agreements on data interoperability, passengers will continue to encounter fragmented, inefficient systems. Building these standards is a long-term challenge that demands both public and private sector commitment.

Passenger-Centric Innovation and Experience

As expectations shift, transport systems are being reimagined around user experience. Travellers will seek greater autonomy and responsiveness, expecting systems to adapt dynamically to their needs - whether that means rerouting during service disruptions or tailoring travel information to individual preferences.

Digital authorisation technologies, in this context, must serve as more than gatekeepers. They become the interface between the physical and digital journey, capable of anticipating, learning from, and responding to passenger behaviour.

These technologies must also navigate the balance between seamlessness and consent. A frictionless experience cannot come at the cost of transparency or personal agency.

The ability to opt in, opt out, or understand what data is being captured and why will be fundamental in maintaining public trust. As systems grow more autonomous, the design of these consent mechanisms becomes a critical factor in sustainable adoption.

A significant design question remains around how much choice passengers will have in the systems they use. If only one type of biometric or digital ID is accepted, then those who cannot or choose not to participate risk being excluded.

A truly user-centric system must offer multiple access pathways to accommodate a wide range of comfort levels and capabilities.

Climate Imperatives and System Resilience

Mobility infrastructure must respond to the growing volatility of climate conditions. As cities contend with rising temperatures, extreme weather, and sea-level rise, entrance and ticketing systems will need to function under less predictable conditions.

A recent analysis of infrastructure stressors calls for technologies that are robust, redundant, and locally

adaptable. This includes everything from waterproof gate mechanisms to decentralised control systems that continue operating during network outages.

Materials, energy efficiency, and lifecycle impact will also come under increased scrutiny. Sustainable design principles should be embedded into access control systems - not only to reduce carbon emissions but to ensure long-term viability in a world where energy security and environmental responsibility are closely linked.

There is an opportunity to rethink the relationship between access systems and energy generation. Smart infrastructure could be designed to capture and store energy, potentially powering auxiliary systems or feeding back into the grid. Energy-aware ticketing and entrance systems would reinforce broader city sustainability goals while providing redundancy during outages.

Adapting to Demographic and Technological Change

The ageing global population presents one of the most pressing design challenges. Older adults, as well as users with disabilities, will require systems that are intuitive and forgiving.

While some may be digitally literate, others will depend on interfaces that offer clear instructions, multiple modes of feedback (visual, tactile, auditory), and robust support in the event of system failure.

Exponential advances in technology will reshape user expectations. The integration of AI, biometrics, wearables, and other emerging interfaces will necessitate platforms that are modular and future-proof.

Entrance control systems must be able to evolve alongside broader digital ecosystems - adapting to new protocols, regulatory requirements, and security threats without requiring wholesale replacement.

Increased reliance on AI and automation introduces its own set of challenges. Systems must be capable of learning from real-world usage without becoming biased or opaque.

Transparent decision-making, particularly where access is denied or flagged, will be critical. Ethical considerations around machine learning, data governance, and system auditability must be embedded in the design phase—not retrofitted in response to criticism.

Urban Deployment: Case Study of Metro Barcelona

A practical illustration of digital access transformation can be found at Metro Barcelona's Ernest Lluch station.

Serving as a high-volume interchange between metro and tram services, the station was designed from the outset to integrate advanced ticketless infrastructure. Full-panel tripod turnstiles were installed to manage both flow and security, with features that prevent tailgating and physical intrusion while maintaining rapid throughput.

Sustainability was built into the deployment with energy-efficient materials and systems used. Importantly, the station prioritised user experience without sacrificing protection, demonstrating how security and convenience can coexist when supported by good design.

This project offers lessons for wider

Gunnebo Metro Tripod Turnstile

With a classic design and small footprint for indoor or outdoor use, Gunnebo Metro Tripod Turnstile is a simple and effective solution for mass transit. Using 316 grade stainless steel for years of reliable use and with a flow rate of up to 40 passengers per minute, Metro Tripod Turnstile features fare avoidance detection and AFC technology for ticketless travel.

Full-panel tripod turnstiles manage both flow and security at Ernest Lluch station

adoption. Systems must be intuitive yet secure, efficient yet inclusive, and robust enough to manage diverse passenger needs. Urban infrastructure, particularly in multi-modal contexts, benefits when access control is conceived as a central design challenge rather than a technical afterthought.

The Barcelona project underlines the importance of local context. What works in one city may not automatically apply elsewhere. Transit authorities and infrastructure providers must conduct detailed needs assessments, stakeholder consultations, and pilot phases to ensure that digital entrance control systems are genuinely aligned with user behaviour and cultural norms.

Nathan Anstee, VP of Mass Transit of Gunnebo Entrance Control added: “Today’s metro passengers expect

““Today’s metro passengers expect a seamless experience through any metro network.”

Nathan Anstee, VP of Mass Transit, Gunnebo Entrance Control

a seamless experience through any metro network. What our ongoing collaboration with Metropolitans de Barcelona demonstrates is the continuing need to evolve entrance control solutions to achieve these requirements.

“At Ernest Lluch, we have met the local brief with our SpeedStile installation, working closely with the team from concept to completion. The result is a contactless, smart system that works to improve the flow of passengers, adapting to different busy periods such as peak hours. The advantage of remote monitoring is key to making sure there is no disruption, and any issues can be resolved instantly.

As Metro Barcelona continues to expand, investments in smart entrance control technology will be critical. By leveraging smart, stylish solutions like Gunnebo’s SpeedStile, TMB aims to meet the increasing demands of urban mobility while upholding the highest standards of safety, security, and passenger experience.

Recognising the shift to seamless travel requirements, Gunnebo Entrance Control is also working with the leading passenger mainline services wholly within Wales in the United Kingdom to support multiple ticketing options. This includes 1D and 2D barcodes, ITSO smart cards, and future-proof technology while minimising disruption to passengers and infrastructure.

Freight and Security in Integrated Systems

As passenger systems evolve, freight networks are being reimagined through the lens of digital authorisation.

Autonomous trains, AI-driven logistics, and subterranean delivery pipelines will require access systems that validate not people, but automated agents, cargo manifests, and authorised personnel.

The principles remain consistent: secure, auditable, and adaptive access to shared infrastructure.

The technologies developed for passenger use - such as biometric scanners and smart gates - can be reconfigured to meet the needs of secure freight corridors, particularly in environments with limited human oversight.

Freight access points present a unique set of security challenges. Tampering, unauthorised entry, and system bypasses must be guarded against using biometric validation, real-time surveillance, and AI-based anomaly detection.

The fusion of freight and passenger data flows requires new safeguards to prevent crossover vulnerabilities or the misuse of multi-source data.

Through Gunnebo's SpeedStile, Transport Metro Barcelona aims to meet the increasing demands of urban mobility

Smart Cities and the Station as Platform

Transport hubs are becoming multifunctional spaces supporting retail, entertainment, and public services to enhance customer experiences and generate revenue beyond transport.

Stations of the future are expected to operate as microcosms of urban life, offering workspaces, shops, cultural venues, and more. This shift involves integrating retail offerings into transport hubs, offering convenient shopping for both travellers and non-travellers.

In these environments, the success of retail in transport hubs depends on careful planning and execution. Entrance control takes on a new dimension - facilitating not only transport but also safety, navigation, and interaction across a range of public and private services.

Such systems must be context-aware and configurable. A gate that serves commuters during rush hour might support building access, crowd control, or event ticketing at other times. Connections between transport, security, and civic data systems becomes essential, as cities strive for integrated, flexible solutions that scale with urban complexity.

There is potential to embed behavioural analytics into entrance control systems, using real-time data to inform crowd control, space usage, and emergency planning. As stations take on a broader civic role, access systems will become tools not only for physical control, but for urban insight and public policy.

As traveller numbers keep increasing and as retailers' formats and fulfilment methods become more flexible, travel's role in retail is likely to take off further still. This impacts on security and entrance control expanding to combat challenges such as shoplifting and tailgating.

Framing Mobility in 2050 and Beyond

The momentum behind ticketless travel reflects deeper transformations in how cities function, how citizens

move, and how services are delivered. Digital entrance control systems will be critical to managing these transitions, but they must be shaped by thoughtful design, informed by robust research.

The future of mobility hinges on systems that are open yet secure, automated yet inclusive, and smart yet accountable. Tailored solutions are integral as no single system will fit all contexts.

The growing body of global examples provides a strong foundation for action. The challenge now is to ensure that innovation serves all users, supports climate goals, and strengthens the social contract at the heart of public infrastructure.

Achieving these goals requires more than technological innovation. It demands cross-sector collaboration, proactive policy frameworks, and ongoing public engagement. The future of ticketless travel - and indeed of digital mobility more broadly - will depend on maintaining a critical balance: between efficiency and ethics, automation and agency, innovation and inclusion.

Gunnebo Entrance Control is working with metro networks globally to support the transition toward more efficient, secure and adaptable entrance control.

By applying experience gained and technical support, Gunnebo Entrance Control helps operators integrate entrance control systems that respond to local conditions while maintaining global standards for safety and performance. This includes supporting diverse ticketing formats, accommodating varying passenger volumes, and ensuring long-term serviceability through modular, remotely monitored infrastructure.

These collaborations reflect a broader commitment to sustainability and helping urban transport systems adapt to evolving mobility demands without compromising operational resilience or passenger experience.

Contact us for more information on our solutions for mass transit.

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About Gunnebo Entrance Control

Gunnebo Entrance Control is a global leader in entrance control management solutions, supporting metro operators worldwide in the delivery of secure, reliable, and efficient passenger movement.

Our entrance control systems are designed to meet the unique challenges of evolving high-volume urban transport - helping metros balance throughput, safety, and system resilience in increasingly complex environments.

With a focus on modular, scalable solutions, we enable seamless integration with modern ticketing formats, including contactless, barcode, and smartcard technologies. Remote monitoring and diagnostic tools ensure rapid response and minimal downtime, supporting continuous operation even during peak demand.

Gunnebo's global presence is matched by a strong commitment to local engagement, ongoing support and ensuring each solution aligns with regional infrastructure needs and user expectations.

Through long-term collaboration with transit authorities, we help shape the future of metro travel - combining intelligent design and sustainable solutions with dependable performance.

For more information:
gunneboentrancecontrol.com

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