

EXECUTIVE STUDY MISSION TO ASIA

2025



**Learning from Global Leaders in Transit Performance:
Advancing Excellence, Efficiency, Safety and Innovation**

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Introduction: Overview and Major Findings of Mission

A high-level delegation of APTA members traveled to Asia from November 5 to 15, 2025 to explore leading practices in public transportation and rail. Led by APTA Chair Leanne Redden and President and CEO Paul Skoutelas, the group included transit agency CEOs, board members, and private-sector leaders, representing the full breadth of the U.S. transit industry.

The mission offered a unique opportunity to experience world-class transit systems in Singapore, Seoul, and Tokyo—three metropolitan regions distinguished by their consistent focus on improving transit service delivery and enhancing the customer experience.

Over the course of ten days, the delegation conducted site visits and participated in roundtable discussions with senior officials

from key agencies and operators, including the Singapore Land Transport Authority, Singapore's main rail and bus operators, SMRT Corporation (SMRT) and SBS Transit (SBST), the Seoul Metropolitan Government and Seoul Metro and the Japanese Ministry of Land, Infrastructure, Transport and Tourism, the Japan Transport and Tourism Research Institute and key high-speed, regional and heavy rail operators JR East, JR Central and Tokyo Metro.

“The study mission was a unique opportunity to gain insights on the innovation policies, practices and technologies that have led to exceptional levels of service, safety, reliability and efficiency.”

Leanne Redden, APTA Chair



A Shared Commitment to High Performance

Across all three cities, transit systems operate at exceptionally high levels of service, safety, reliability, and efficiency. These outcomes are not incidental; they are the result of sustained investment, aligned policy frameworks, and governance models designed with clear, long-term objectives in mind. Public transportation is treated not as a standalone service, but as a central pillar of economic vitality and quality of life.

A defining commonality is a holistic approach to mobility. In Singapore, this is reflected in a deliberate “car-lite” strategy and the development of multiple urban centers to optimize transit capacity. In Seoul, it is embodied in TOPIS, an integrated control system that centralizes all mobility and traffic data to inform real-time decisions. In Tokyo, it is seen in the coupling of high-capacity transit with intensive land development, generating both ridership and revenue through strategic use of space around stations and depots.

Underlying these approaches is a deeply embedded culture of continuous improvement. Innovation is introduced rapidly yet always grounded in a disciplined focus on fundamentals—safety, reliability, and operational excellence.

Technology Enabling Smarter, Safer Systems

Technology plays a critical role in enabling these transit systems to perform at scale. Advanced applications of artificial intelligence, automation, and data analytics are being used to improve operational efficiency, strengthen safety, and enhance customer experience.

Examples observed during the mission illustrate both the breadth and maturity of technology deployments. In Singapore, a digital twin of operations and maintenance—known as

Overwatch—provides real-time system visibility to leadership.

Seoul has developed a highly sophisticated camera and monitoring ecosystem to detect and respond to safety and security issues across its network. In both Tokyo and Singapore, robotics are actively deployed in stations to support customer service, security monitoring, and cleaning functions.

These technologies are not pursued for their own sake; rather, they are targeted investments designed to achieve resource efficiencies, improve maintenance precision, and enable faster, more informed operational decision-making.

Investing in the Workforce of the Future

Equally important is the emphasis placed on workforce development. Each system demonstrates a strong commitment to building a resilient, flexible, and highly skilled workforce capable of adapting to technological change.

This is achieved through robust cross-training across roles and disciplines, realistic simulation-based training environments, and deliberate strategies for transferring knowledge across generations. Automation is positioned not as a replacement for labor, but as a complement—helping agencies address workforce constraints while improving productivity and service quality.

Ultimately, the study mission reinforced the profound social and economic value of sustained investment in public transportation. The systems in Singapore, Seoul, and Tokyo demonstrate what is achievable when policy, funding, planning, and operations are aligned over the long term. For the United States, the experience underscores the opportunity—and necessity—of doubling down on efforts to strengthen and expand transit systems.

Singapore

Integrated by Design: A System Shaped by Policy, Planning, and Demand Management

Singapore has been experiencing steady population growth, alongside a growing aging population and increased travel demand over the past few decades. In response, there has been a very intentional and sustained shift toward public transportation, spanning heavy rail, light rail, and bus. Today, the system carries approximately 3.6 million daily passenger trips on heavy and light rail combined and 3.8 million passenger trips on the bus network, underscoring its central role in national mobility.

The Singapore Land Transport Authority (LTA) serves as the central agency responsible for planning, designing, building, managing, and regulating the country's entire land transport infrastructure and systems. This includes public transit, roads, taxis, ride-hailing, and active mobility.



Within a dense city-state context, LTA balances efficiency, safety, and sustainability while coordinating how people and goods move across a highly constrained urban environment. With respect to transit, LTA's core responsibilities include planning and regulating bus and rail (MRT/LRT) systems to ensure safe, reliable, and accessible service. Fare regulation and integrated ticketing are overseen by the Public Transport Council.





APTA Delegation Meeting with Land Transport Authority (LTA) Singapore

What distinguishes LTA globally is the breadth of authority consolidated within a single entity, enabled by Singapore's governance model. Unlike most transport authorities, LTA not only delivers infrastructure but also actively manages demand. Through tools such as the Certificate of Entitlement (vehicle caps), Electronic Road Pricing, and stringent parking standards, Singapore proactively manages congestion rather than reacting to it.

Equally important is the tight alignment between transport and land-use planning. LTA works in close coordination with the Urban Redevelopment Authority and other land-use agencies within a long-term, forward-looking planning framework including a 40 to 50 year Concept Plan and a 10 to 15 year Master Plan.

LTA also operates with a strong, data-driven and future-oriented mandate, with the authority to pilot and regulate innovations—such as autonomous vehicles, smart traffic systems, and mobility-as-a-service—and scale them quickly within a unified regulatory structure.



A busy rail station in Singapore

Rail at the Core: Building a Seamless, High-Capacity Network

Public transportation is the backbone of mobility in Singapore. Rail forms the foundation of the system, complemented by a bus network designed to enable seamless transfers and maximize overall network efficiency. The long-term vision is a “45-minute city,” with decentralized employment hubs supporting bi-directional commuting and with 80% of households within a 10-minute walk of rail.

“The main show in Singapore is public transportation. LTA ensures transit remains top of mind and use.” Jeremy Yap, Senior Director at Singapore’s Ministry of Transport

To achieve this vision, Singapore is prioritizing accessibility and network coverage. Significant expansion is underway, with a target of more than 225 miles of rail by 2040, alongside increased bus and rail service frequency and a 25% reduction in waiting times through system upgrades.

At the same time, Singapore is repurposing road space to support walking and cycling and strengthening pedestrian connectivity to transit. With a clear “car-lite” objective, the city-state has set a 0% growth target for the car population and only a 1% annual increase in road infrastructure, while continuously forecasting and monitoring travel demand and system capacity.

Governance and Contracting: Aligning Incentives and Accountability

Singapore’s rail systems are operated primarily by SMRT (65%) and SBS Transit (SBST) (35%), while four public bus operators serve the network: SBST (60%), SMRT (30%), and Go-Ahead Singapore and Tower Transit Singapore (10% combined).

Singapore’s institutional model deliberately separates asset ownership from operations. LTA owns the infrastructure and establishes rigorous, outcome-based performance standards, while operators focus on operations and maintenance.

A reformed rail financing framework adopts an asset-light approach, with shorter contract durations and shared fare revenue risk. Enhanced maintenance regulations are designed to improve asset governance and reliability. Operators pay annual license charges that contribute to asset replacement and renewal, while LTA retains the ability to make network-wide investment decisions and plan capacity holistically.

Singapore Rail System Map





Courtesy of Land Transport Authority, Singapore

Similarly, since 2016, buses operate under a gross-cost contracting model under which LTA provides the infrastructure and assets while operators are paid a service fee and take on most of the operating risk. This model allows LTA to respond more dynamically to demand while maintaining accountability and encouraging innovation.

The transition toward a greener fleet is also a major priority, with targets of 50% electric buses by 2030 and a fully cleaner-energy bus fleet by 2040. In parallel, LTA is advancing future technologies, with a recent award of a tender for six autonomous public buses (16-seaters) to be deployed on two fixed routes, with an option to purchase 14 additional AV buses if objectives are met. The policy approach is clear: technology must be guided by public objectives, avoiding unintended consequences such as increased congestion from widespread AV adoption.

Digitalization and the Customer Experience: From Functional to “Lovable”

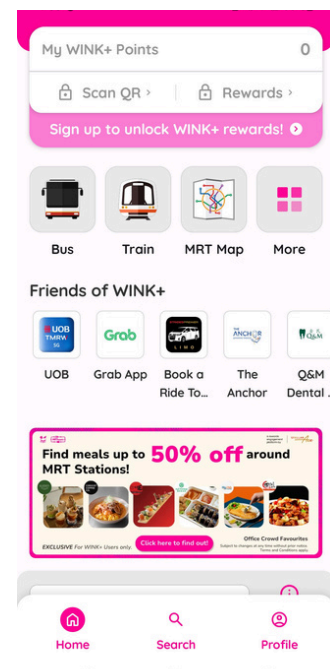
Singapore is leveraging technology to enhance both operations and the customer

experience. Initiatives include digital twins (such as SMRT’s Overwatch), predictive maintenance systems, and integrated applications designed to deliver more personalized journeys.

LTA’s “Make Public Transport Lovable” campaign reflects a broader shift toward customer-centric design, with greater emphasis on accessibility, station experience, and digital engagement.

Apps are increasingly gamifying the rider journey and offering rewards that build loyalty and engagement. SMRT’s WINK+ platform exemplifies this approach. The app integrates journey planning, real-time service information, and retail engagement, allowing users to earn points for travel and interactions that can be redeemed for rewards. It effectively connects transit usage with the broader urban experience, positioning transit as a gateway to retail, dining, and community activity.

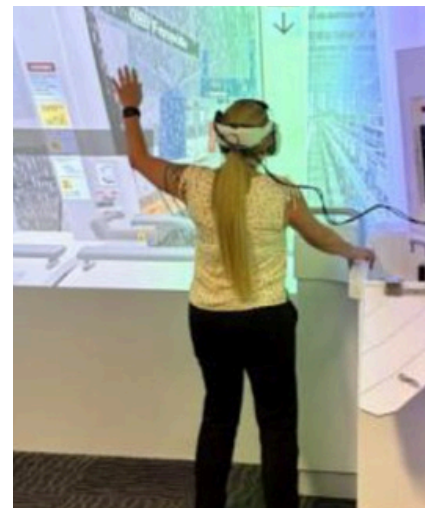
SMRT’s WINK+ App



Workforce, Operations, and Innovation: Sustaining High Performance

Singapore's transportation system places a strong emphasis on workforce development, recognizing that long-term performance depends on a skilled and adaptable workforce. Agencies and operators promote cross-training across roles and disciplines, supported by simulation-based training environments and continuous learning models.

At SBST, for example, rail engineers are supporting bus electrification efforts, demonstrating the deliberate integration of skills across modes. This is complemented by the digitalization of workflows—including maintenance, reporting, and training systems—enabling more efficient operations and enhanced use of data.



Operator training at SBST

A systems-thinking approach, combined with strong collaboration between operations and engineering, supports high levels of reliability. There is also a deeply embedded culture of continuous improvement (“Kaizen”), enabling innovation to be implemented more rapidly while maintaining a strong focus on fundamentals—comfort, cleanliness, safety, security, and reliability. Senior leadership at SMRT, for example, regularly conduct “Gemba” walks with frontline staff to observe processes firsthand, identify inefficiencies, and strengthen engagement with employees.

Operator training facilities at SBST



Maintenance, Safety, and Real-Time System Management

Operators have established a strong safety culture, supported by robust track access management systems, smart driver assistance technologies, and expanded use of video analytics. Bus operations are being enhanced with technology that monitors driving performance, including detection of distracted or fatigued driving. At both SMRT and SBST, Maintenance and Engineering Centers (MECs) play a central role in rail system oversight, monitoring the condition of the entire network—including power, computers, rolling stock, track, and signals—while providing in-house data analytics. MECs support network-level maintenance planning, operational control, and engineering coordination.

At SMRT, the co-location of the Operations Control Center (OCC) with the MEC enables maintenance and engineering teams to work directly alongside operations, allowing for rapid response to faults. Senior decision-makers also have access to a web-based version of the OCC, ensuring continuous visibility across the network and enabling faster, more informed decision-making. An automated decongestion module further supports system resilience by truncating disruptions and preventing delays from propagating across the wider network.

Data, AI, and Predictive Maintenance

AI is being actively deployed by SMRT to improve productivity, enhance safety, and reduce energy consumption. Applications

include track access management that enables same-day maintenance access—eliminating the need for two-week advance scheduling—and intrusion detection pilots on light rail systems to alert the OCC to track incursions and unsafe passenger behavior near platform edges. On the security side, expanded use of video analytics has reduced the need for manual monitoring.

There is also a deliberate effort to strengthen data-driven decision-making. Rail engineers are paired with data scientists to increase the generation of actionable insights. This is supported by the development of a common data environment that breaks down organizational silos and improves oversight and innovation.

“Sustainable maintenance [is being achieved] through digitalization... reducing and eliminating failures per hour is the driving KPI, and safety is the lens through which data is being viewed.” SMRT

Data is increasingly being leveraged to optimize asset management across different time horizons. In the short term, it is used to maximize resource efficiency and improve return on investment; in the medium term, 3D digital twins are being developed to optimize maintenance scheduling; and in the longer term, data will support more effective asset renewal planning. Both SMRT and SBST are advancing toward predictive and ultimately condition-based maintenance approaches, with failure prevention and safety as the overarching objectives.

At SBST, sustaining high reliability (measured through MKBF) is supported by regular coordination between engineering and operations teams, combined with a strong culture of follow-through and attention to detail.

“To sustain high standards of reliability, we have developed a methodological approach focused on discipline and rigor, combined with creativity and innovation. This approach has been validated across all our lines in Singapore, as well as those operated by our parent company overseas, including Auckland and Stockholm.” SBST

Innovation and Customer Service

Innovation remains a key focus. SBST works with local start-ups to develop use cases and co-create solutions for public transit. AI is being used to enable more demand-responsive services, while AI chatbots and digital concierge tools are freeing staff capacity to focus on safety and security. This includes Silvia, described as the world’s first sign-language bot.

In stations, robots support customer service, maintain cleanliness, and provide additional monitoring for safety and security. At the same time, operators continue to emphasize the importance of human presence: on the automated North East Line (NEL), for example, a customer service officer is positioned at the front of each train to

ensure safety, responsiveness, and on-time performance.

For bus operators, workflows have been fully digitalized, notably internal communications and training. Maintenance processes are also becoming more automated, including systems for monitoring tire tread conditions.

SMRT and SBST are leveraging the station environment as both a commercial and community asset. Rail operators actively manage station space to support retail, advertising, and services, including food courts and small business activation, in order to drive ridership and revenue.

At SBST, a deliberate balance is maintained between commercial and community uses of station space. Efforts are underway to create distinct station identities and a stronger sense of place—for example, partnering with nearby cultural institutions to extend their presence into the station environment.



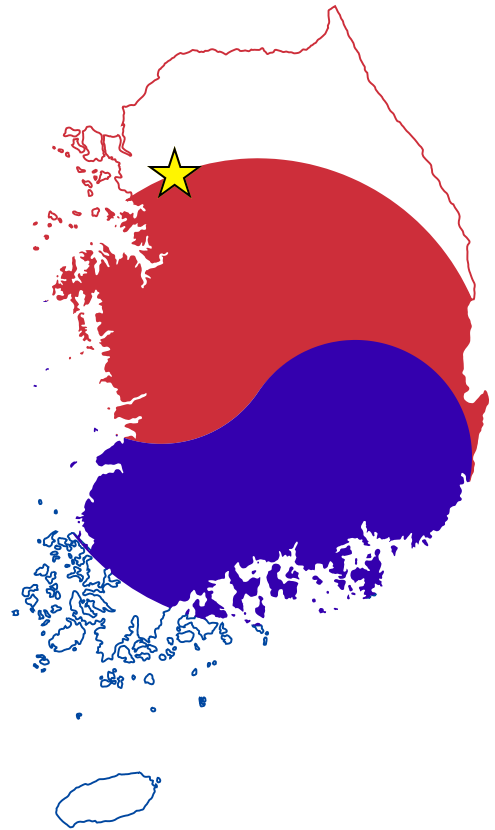
SMRT station robot

Seoul

Powering a Fully Integrated Megacity Mobility System

Seoul operates one of the world's largest and most integrated urban transit systems: a dense rail network (24+ lines, ~1,300 km across the metropolitan area), an extensive city and regional bus network organized by route type, and widespread taxi and bike services—all coordinated to prioritize high-frequency, high-capacity mobility. Public transportation accounts for approximately 65% of modal share, with annual subway ridership in the billions, making rail the backbone of daily travel.

Seoul's success is rooted in integrated planning (linking land use and multimodal design), strong city-led ownership and coordination, ubiquitous fare technology (T-money), and continuous investment in capacity and digital tools. The Seoul Metropolitan Government (SMG) sets transportation policy, plans expansions, owns key fare and IT assets, and funds capital works, often with national government support for major projects. SMG also aligns land use with transit corridors to reinforce ridership and system efficiency.



TOPIS: The Brain of Seoul's Transportation Network

TOPIS (Transport Operation & Information Service) is Seoul's centralized traffic management and information system. Using real-time data from GPS-equipped buses, taxis, bikes, cameras, sensors, and fare systems, TOPIS manages traffic signals, bus operations, and incident responses, including weather-related disruptions. Features include bus lane enforcement, signal priority, dynamic bus detours, automated parking violation detection, and predictive traffic management with lane control.

A next-generation cooperative ITS platform using V2X technology is also in place. User interfaces display real-time passenger loads, taxi availability, transit usage patterns, and bike-sharing inventory, infrastructure placement, and service quality. Advanced data analytics is used to improve routing, infrastructure placement, and service quality.



Seoul's Automated Vehicle Pilot

Demand Management and Automation

A congestion charge introduced in 1996 at a key tunnel into the city center led to a 20% reduction in traffic and a 75% increase in speeds. This was complemented by a Green Transportation Zone introduced in 2017, targeting low emissions year-round in the central city and seasonally in surrounding areas. Revenues support transit and environmental programs.

Seoul is advancing autonomous mobility, with seven pilot zones and 35 vehicles in operation (approximately 144,000 trips to date). Free driverless buses support late-night and early-morning service. The long-term plan is to integrate AV management into TOPIS to expand service coverage and address driver shortages.



Bus Reform and Fare Innovation

SMG oversees buses through a semi-public model: private firms operate routes while the city manages planning and performance. The 2004 Public Transportation Reform dramatically improved efficiency and integration, introducing 105 miles of BRT. Bus services are color-coded: blue (trunk), green (branch), yellow (circulation), and red (express).

Seoul's distance-based fare system allows up to four free transfers within 30 minutes. The 2024 Climate Card provides unlimited use of transit for about \$46/month and is used by 720,000 daily riders, with plans for national expansion. Seniors ride subway lines free and can receive a \$200 bus credit if they surrender their driver's license.

T-money - the rechargeable contactless fare payment system - underpins the entire fare ecosystem, enabling seamless multimodal travel via cards and mobile payments. It is currently piloting a tapless "be in, be out" system in 65 stations and 600 buses. T-Money's testing lab also allows for the rapid analysis of fare payment scenarios.



Seoul Bus Shelter

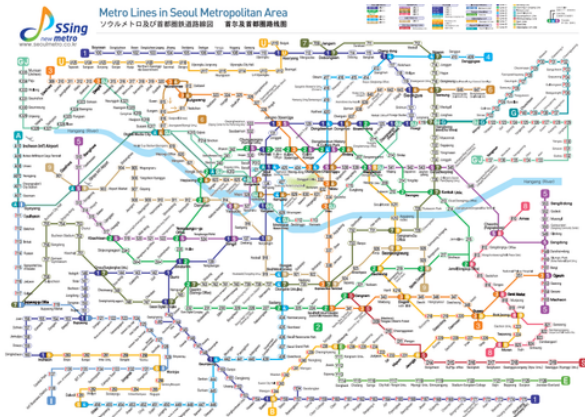
Rail Operations, Safety, and Innovation

Seoul Metro operates and maintains core subway lines and stations inside the city, coordinating with Korail (the national railway) and private operators for through-services. It takes responsibility for rolling stock procurement, station upgrades, and accessibility improvements while the city and national government typically finance major new tunnels and lines.

Visit of Seoul Metro Depot



Workforce training is a key focus as the use of advanced technologies accelerates. Seoul Metro incentivizes a culture focused on innovation by offering bonus points for bold and value-aligned ideas even without immediate tangible benefits.



Seoul Rail System Map

Through the use of an extensive CCTV system that integrates AI analytics and a digital twin platform, Seoul Metro focuses heavily on security and crowd management. Platform screen doors have significantly improved safety while reducing dust (18.8%), noise (7.9%), and cooling loads (30%). Seoul Metro entrusts a subsidiary for cleaning, security for vehicle depots and other facility management tasks.

Seoul Metro System

The Seoul Metro system exemplifies best-in-class wayfinding through a layered, standardized system that prioritizes clarity, redundancy, and user accessibility. Navigation is anchored by consistent color-coded lines, sequential station numbering, and multilingual signage, enabling both local riders and international users to navigate intuitively. This is reinforced by a clear hierarchy of signage, highly visible directional cues, and numbered exits that extend wayfinding beyond the station to precise street-level destinations. Real-time digital displays, platform screen door integration, and continuous transfer guidance further reduce uncertainty and streamline passenger decision-making, particularly in complex, high-volume stations.

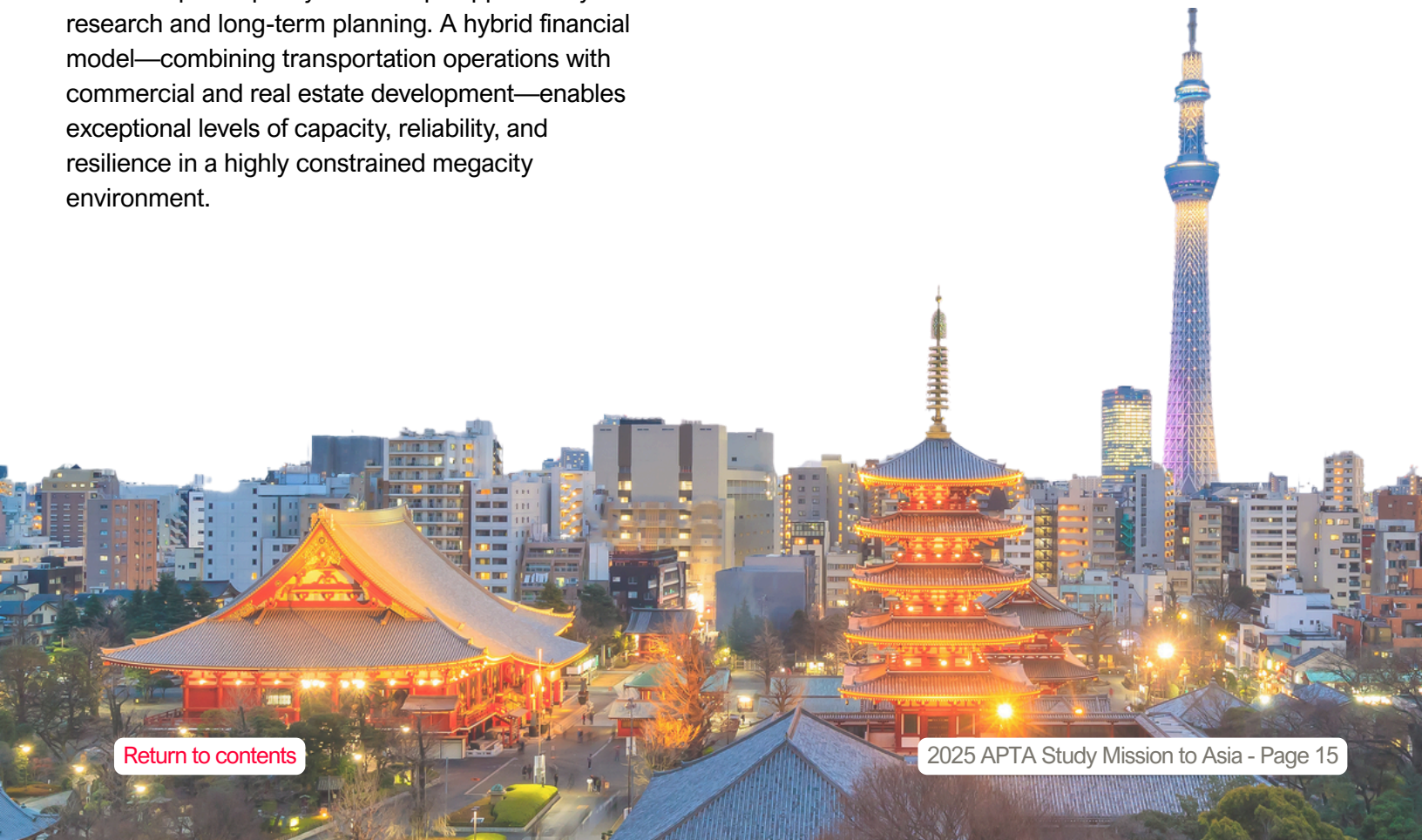
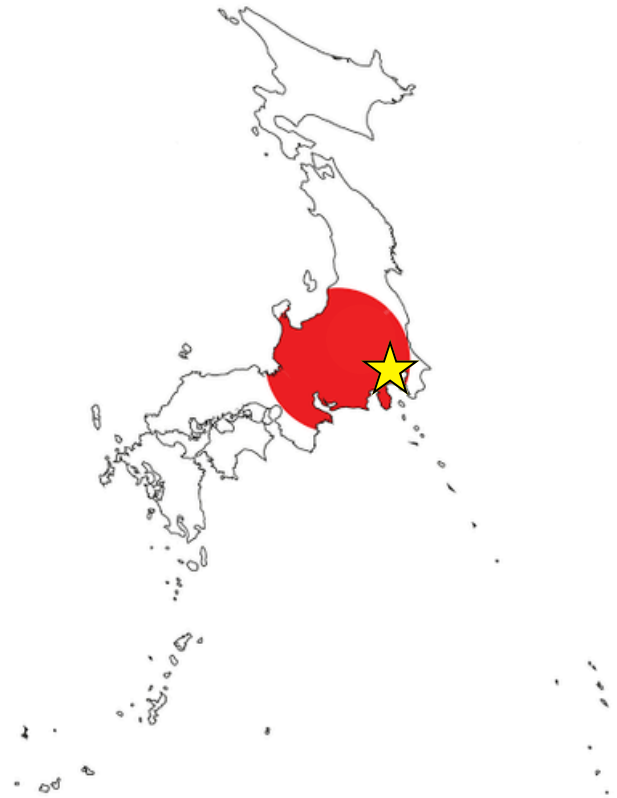


Tokyo

Interoperability and Network Design Excellence

Tokyo's transit system is a dense, highly integrated, multi-operator network of rail and bus services carrying millions of passengers daily. It includes the national Japan Rail (JR) companies—notably JR East—alongside two primary subway operators, Tokyo Metro and Toei, as well as extensive bus services, monorail, and regional high-speed Shinkansen connections. Rail accounts for roughly 90% of public transportation usage in the urban core, underscoring its central role in metropolitan mobility.

The strength of Tokyo's system lies in its seamless interoperability, dense multimodal connectivity, and sustained public policy leadership supported by research and long-term planning. A hybrid financial model—combining transportation operations with commercial and real estate development—enables exceptional levels of capacity, reliability, and resilience in a highly constrained megacity environment.



Integrated Planning, Infrastructure Delivery and Innovation

Tokyo continues to evolve through a combination of incremental network expansion, major station redevelopment, and technically advanced tunneling in dense urban settings. Large-scale projects are delivered through close public-private collaboration and strong integration with land use planning. This coordinated approach helps limit costs, accelerate delivery timelines, and ensure system redundancy. Contactless IC fare cards—including JR East's Suica and the interoperable PASMO system—enable seamless, pay-as-you-go travel across virtually all operators and modes. Mobile wallet integration further enhances ease of use.

Operators deploy a wide range of advanced technologies, including real-time passenger information systems, advanced train control (including CBTC implementation), platform screen doors, energy-efficient rolling stock,



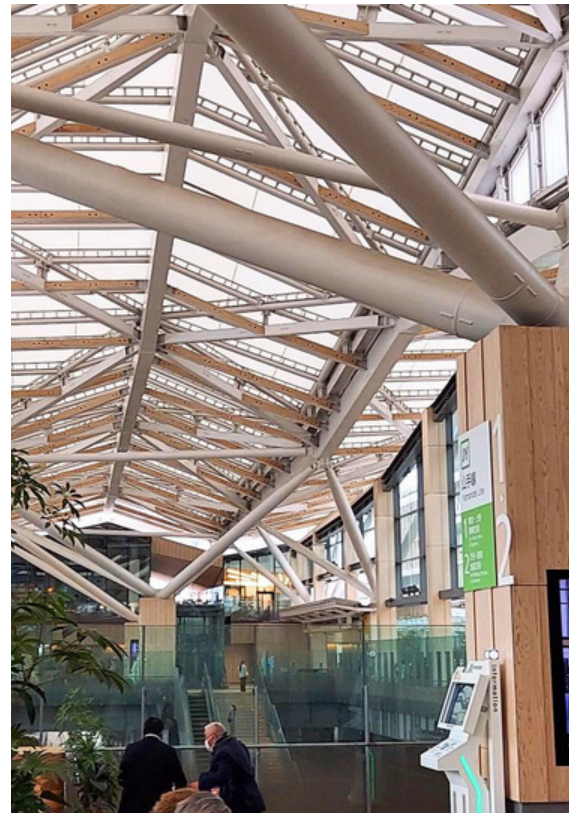
and data analytics for operational optimization and crowd management. Accessibility improvements—including enhanced wayfinding, additional elevators, and clearer high-visibility information systems—are being implemented systemwide to reduce barriers and improve the customer experience.



JR East: Commercial Innovation at Scale

East Japan Railway Company (JR East) is the dominant commuter and regional operator in Tokyo, running approximately 11,847 trains per day and carrying an average of 15.57 million daily passengers. Its network spans the Kanto and Tōhoku regions including Tokyo with major commuter lines such as the Yamanote and Chūō lines, as well as bus systems, monorail services, and high-speed rail connections.

JR East operates as a private, vertically integrated company, owning most of its infrastructure and stations. It generates approximately \$19.2 billion in annual revenue, with 67% derived from transportation operations and 33% from lifestyle and commercial businesses.



Takanawa Gateway City Station

A defining feature of JR East's growth strategy is its "Lifestyle Solutions" business line, which complements its core mobility services. This approach integrates real estate, retail, digital platforms, and community development into the rail network, positioning stations as hubs of daily life. Transit-Oriented Development (TOD) is central to this model, with investments such as Takanawa Gateway City, a newly built urban area, reflecting a long-term commitment to community-building. In this development, 50% of space is dedicated to commercial and cultural uses (including innovation incubation), with the remainder split between office and residential uses. The objective is to provide better quality of life to customers, subsequently improving the value of JR East assets.

Advanced Maintenance and Operational Excellence at JR East

JR East demonstrates industry-leading maintenance practices through the use of condition-based monitoring and predictive maintenance powered by AI and rolling stock data. Maintenance knowledge is digitized, systematized and centralized so all have access in real time including the OCC. Fully integrated “smart maintenance” platforms combine data across rolling stock, track, and signaling systems.

Maintenance processes are highly optimized: heavy maintenance is conducted without decoupling trainsets, allowing for simultaneous work across multiple systems. Predictive models assess component degradation, enabling targeted interventions rather than fixed scheduling. These innovations have reduced inspection times by over 50% in some applications.

Operational efficiency is also supported by disciplined workplace practices, such as visual tool management systems that eliminate lost equipment, synchronized workflows using real-time communication headsets, and coordinated team rotations.



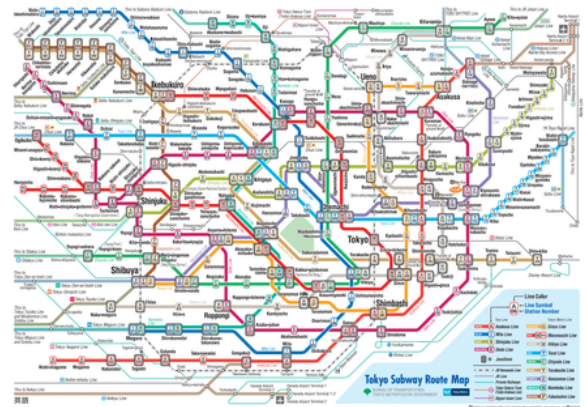
Maintenance at JR East Rolling Stock Center

At the rolling stock center, approximately 25 staff work simultaneously on a single trainset across multiple levels, enabling the completion of full maintenance cycles within a single day.

Continuously improving maintenance practices is a core focus at JR East. Periodic maintenance innovation competitions are carried out to share new good practices and reduce maintenance bottlenecks. The rolling stock data science unit analyzes data obtained from the monitored vehicle and compares it with actual vehicle conditions. This offers insight into deterioration trends, the optimal prediction of failure and optimal maintenance methods.

Tokyo Metro: Expansion and Urban Value Creation

Tokyo Metro operates nine subway lines and approximately 180 stations, providing dense inner-city service and extensive through service with partner railways.



Tokyo Metro Map

Its 2024 initial public offering (IPO) marked a major governance shift, with 50% of shares sold to public investors while the national and metropolitan governments retain 27% and 23% stakes respectively, with plans for further divestment.

Tokyo Metro is pursuing network expansion, including extensions of two lines to increase capacity and connectivity. The company emphasizes safety and resilience through flood prevention measures and advanced security systems. At the same time, it positions itself as an urban design and lifestyle creation company leveraging station assets to enhance real estate value, improve passenger environments, and diversify revenue streams through retail and advertising.

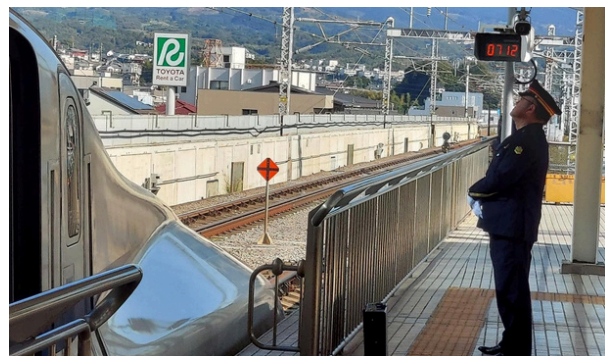


Tokyo Metro

JR Central: Safety Culture, Training, and Innovation

JR Central operates a similarly integrated model, managing both operations and maintenance across its Tōkaidō Shinkansen and conventional line network centered on the Nagoya and Shizuoka areas.

A defining principle across Tokyo operators is a focus on whole-system optimization rather than isolated subsystem improvements. At JR Central, cross-disciplinary collaboration is encouraged, with engineers from multiple fields working together and centralized within shared environments.



JR Central Shinkansen

Large-scale testing facilities replicate real-world conditions, allowing for rigorous validation of rolling stock, track, and infrastructure systems. This integrated approach ensures that innovations are both technically sound and operationally effective.

Looking ahead, JR Central is addressing workforce challenges through automation and advanced inspection technologies. Commercial trains are now equipped with inspection systems, eliminating the need for dedicated inspection trains. Automated image analysis detects defects such as loose bolts, improving both efficiency and inspection frequency. By 2028, high-speed trains are expected to operate at GoA2 automation, maintaining onboard drivers while enabling automated speed adjustments for schedule adherence.



JR Central Shinkansen



Comprehensive Workforce Training and Organizational Resilience

Tokyo’s rail operators place strong emphasis on continuous, hands-on training. Facilities such as the Tokyo Metro Comprehensive Learning & Training Center provide extensive technical and operational training, including signaling systems, electrical infrastructure, customer service, and real-world driving simulations.

Training is fundamental to maintaining JR Central's exceptional safety record, encapsulated in the principle that “learning brings safety and service to the forefront.” The company’s General Education Center provides immersive, scenario-based training using full-scale station and operational replicas. This facility fosters cross-generational learning, collaboration, and innovation among employees.

On-the-job training remains a cornerstone of workforce development. Employees are routinely rotated across functions—including operations, maintenance, and customer service—building system-wide understanding and flexibility. At JR Central, even high-speed train drivers must first gain experience in roles such as onboard conductor and station attendant.

This approach fosters resilience, enabling staff to adapt quickly and maintain service continuity. It also strengthens accountability and operational awareness across the organization.

THE TOKYO METRO COMPREHENSIVE LEARNING & TRAINING CENTER INCLUDES A:

	Safety Consciousness Development Center featuring exhibition rooms and hands-on training
	Signaling Training Room with model trains for teaching signal systems
	Electrical Facilities Training Room with substation, machinery, and communications equipment
	Technical Training Line for practical maintenance training
	Training Line Railway Bridge
	Mock-up stations replicating actual station environments
	A customer service training area
	Trial Simulator for operational training
	Three-car and ten-car train platforms for hands-on learning
	Practical driving line for real-world training scenarios



Key Findings and Takeaways: Advancing U.S. Transit Through Global Lessons

The 2025 APTA Executive Study Mission to Asia reaffirmed that world-class transit systems are not defined by any single innovation or investment, but by the alignment of policy, governance, funding, operations, and customer focus over decades. Singapore, Seoul, and Tokyo each operate within distinct institutional and cultural contexts, yet several common themes emerged that are directly relevant to the United States as it seeks to strengthen transit performance, resilience, and public value.

1 Transit as Core Public Infrastructure - Not a Residual Service

Across all three cities, public transportation is treated as essential national infrastructure—central to economic competitiveness and quality of life. This positioning drives consistent long-term investment, policy alignment, and public support.

U.S. Takeaway: There is a clear opportunity to elevate transit as a core pillar of national and regional policy—better integrating it into economic development and land-use strategies, and strengthening the case for sustained, predictable funding.

“We witnessed the power of sustained investment in transit. It was an affirmation of the value of what our industry delivers every day [to American communities] and the need to keep advancing public transportation in the U.S.”

Paul Skoutelas, APTA President and CEO

2 Integrated Governance Enables System-Level Optimization

Each system demonstrates strong institutional coordination, whether through centralized authority (Singapore’s LTA), city-led integration (Seoul Metropolitan Government), or tightly coordinated multi-operator frameworks (Tokyo). These models enable network-wide planning, aligned incentives, and faster decision-making.

U.S. Takeaway: While governance structures in the U.S. are more fragmented, there is significant potential to improve regional coordination, multimodal integration, and alignment between agencies, operators, and policymakers—particularly in planning, fare systems, and capital investment decisions.

“We could go a long way if we had that intentionality of policy decisions to line up what we’re looking to implement.”
Leanne Redden, APTA Chair

3 Alignment of Land Use and Transit Drives Ridership and Value

A defining feature across all three regions is the deliberate integration of transit and land use. High-density, mixed-use development around stations is not incidental—it is planned, incentivized, and often led by transit agencies themselves.

U.S. Takeaway: Expanding transit-oriented development (TOD) remains one of the most powerful—and underutilized—tools available in the U.S. Stronger alignment with local land-use policies and greater agency participation in real estate and value capture could drive both ridership growth and financial sustainability.

“We don’t have the right integration of all transit and land use components to secure revenue continuously and reinvest value into the community.” APTA Delegation

4 Technology as a Strategic Enabler—Not an End in Itself

Advanced technologies—including AI, digital twins, predictive maintenance, and integrated control centers (e.g., TOPIS)—are widely deployed, but always in service of clear operational goals: safety, reliability, efficiency, and customer experience.

“In Asia, data governance and analysis is being operationalized at scale with a human-centric focus on outcomes.” APTA Delegation

U.S. Takeaway: Technology investments in U.S. systems can deliver greater impact when guided by a disciplined, outcomes-focused approach, with stronger integration across departments and clearer links to operational performance and customer benefits.

5 Data Integration and Real-Time Operations Are Foundational

All three cities rely on comprehensive, real-time data ecosystems to manage operations, respond to incidents, and optimize service delivery across modes. Centralized visibility enables more proactive, system-wide management.

U.S. Takeaway: Advancing toward integrated data platforms and control centers represents a significant opportunity for U.S. agencies to enhance situational awareness, incident response, and predictive decision-making.

6 Workforce Investment as a Strategic Priority

A consistent theme across all systems is deep investment in workforce development, including cross-training, simulation-based learning, and continuous skills development. Automation is used to augment—not replace—the workforce.

U.S. Takeaway: Addressing workforce challenges in the U.S. will require similar emphasis on training, career pathways, and organizational flexibility, ensuring employees are equipped to operate increasingly complex, technology-enabled systems.

7 Customer Experience as a Core Performance Metric

From Seoul's intuitive wayfinding to Singapore's "lovable" transit strategy and Tokyo's seamless interoperability, customer experience is treated as a strategic priority, not an afterthought. Systems are designed to be intuitive, reliable, and attractive to riders.

U.S. Takeaway: Sustained ridership growth in the U.S. will depend not only on service availability but on ease of use, comfort, reliability, and trust. Investments in wayfinding, accessibility, real-time information, and station environments can deliver outsized returns.

"What impressed us tremendously was the pride in their transit systems. [They] talked about building brand affinity to the point where, whether it's an employee or a passenger, they care about the ultimate success of the transit agency." APTA Delegation

8 Culture of Continuous Improvement and Operational Discipline

Perhaps the most transferable lesson is cultural. Across all three regions, there is a deeply embedded commitment to operational discipline, accountability, and continuous improvement—often supported by data, frontline engagement, and leadership visibility.

"All three cities are in expansion mode but it is the speed by which they are innovating across the board which is impressive from AI integration, to automation to process improvements."

Joel Young, APTA Vice Chair

U.S. Takeaway: While structural reforms are important, organizational culture and leadership focus remain critical drivers of performance. Strengthening continuous improvement practices and frontline engagement can yield meaningful gains even within existing constraints.

9 Looking Ahead: A Blueprint for U.S. Transit Advancement

The study mission underscored that achieving world-class transit performance is not dependent on replicating any single model, but rather on adapting key principles to local context. For the United States, this includes:

- Strengthening long-term funding and policy alignment;
- Advancing regional integration and multimodal coordination;
- Leveraging land-use to support transit and vice versa;
- Investing strategically in technology and data systems;
- Prioritizing workforce development and the customer experience.

Taken together, these lessons point to a clear path forward: a more integrated, customer-focused, and performance-driven transit system that is positioned to meet the evolving mobility needs of U.S. communities.

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**Positions at the time of the study
mission in November 2025*