pwc

NTU Nottingham Trent University

Safe journeys: Securing public transit systems in the Middle East

Table of contents

1. Introduction
2. Regional trends – large scale, integrated mobility systems
3. Making transit security a strategic priority
4. Key challenges to safety and security
5. The DOTS Framework
6. Understanding the framework
    - 6.1. **Design**
    - 6.2. **Operations**
    - 6.3. **Technology**
    - 6.4. **Strategy**
7. Our perspective: Priorities for strengthening transit safety and security

01 Introduction

Public transit systems[1] are vital contributors to economic growth, sustainability and social inclusion – and their value depends on reliability. Protecting them is essential to maintaining performance, safeguarding continuity and preserving public trust.

Across the Middle East, governments are investing heavily in public transit as part of the region's wider economic transformation. Research indicates that every US$1bn invested globally in public transit supports approximately 50,000 jobs and generates US$4bn in economic output.[2] Beyond their economic role, transit systems deliver broader societal and environmental value by reducing congestion and emissions, improving air quality and supporting healthier, more liveable communities. They also strengthen social inclusion by providing affordable, accessible mobility for diverse population groups.

But realising this value depends on public confidence in the system. When transit networks feel unsafe or unreliable, ridership falls, disruption increases and investment returns weaken. In this context, safety and reliability are not just measures of operational performance; they are fundamental to long-term value creation.

For this reason, public transit is widely regarded as critical infrastructure. When disrupted, the impact extends beyond the network itself, affecting economic activity, urban mobility and public confidence.

As transit systems expand, the risk landscape becomes more complex. High passenger volumes, interconnected networks, growing reliance on digital systems and diverse operating environments all increase exposure to physical and cyber threats. These are also the very characteristics that make public transit effective and efficient, which means safety and security challenges can no longer be managed through fragmented or reactive approaches. They require coordinated, adaptive responses that reflect the scale, interdependence and operational complexity of modern transit networks. It requires a more integrated approach that brings together design, operations, technology and governance at the system level.

For policymakers, security leaders and transit operators, the challenge is no longer simply protecting transit assets. It is ensuring that rapidly expanding networks remain resilient, trusted and able to deliver the wider economic and social value they were built to generate. In that context, transit security should be viewed not as a downstream compliance requirement, but as a strategic enabler of network performance and public value.

As countries pursue ambitious development and urbanisation goals, ensuring the safety, security and resilience of public transit systems is fundamental to unlocking their full potential in driving economic growth and improving quality of life for all residents.

This report aims to support policymakers, security leadership and transit operators in developing and implementing effective strategies for transit policing and security and sets out a structured framework to support that shift.

02 Regional trends – large scale, integrated mobility systems

Countries in the Gulf Cooperation Council (GCC), are investing heavily in public transit as part of national development agendas to meet the needs of urban populations, while supporting economic diversification and environmental objectives.

The projects below reflect a shift from incremental transit upgrades to large-scale, integrated mobility systems. As these networks expand in scale, reach and interconnectivity, they place greater demands on operations, coordination and security, raising both the strategic value of public transit and the consequences of disruption.

Saudi Arabia - Riyadh Metro

Overview
Six metro lines spanning approximately 176km, with 85 stations, integrated with an 85km three-line bus rapid transit (BRT) network.[3]
Benefit
Expected to reduce car trips by nearly 250,000 per day, saving 400,000 litres of fuel daily and significantly lowering air pollutant emissions.[4]

UAE - Railway Programme

Overview
Rail passenger service connecting 11 cities including high-speed link between Abu Dhabi and Dubai reducing travel time to 30 minutes.[5]
Benefit
Estimated to reduce road transit CO_2 emissions by 21% by 2050 and contribute Dhs145bn to the UAE's GDP through enhanced connectivity and tourism.[6]

Qatar - Doha Metro

Overview
Four lines spanning 100km, with 60 additional stations planned across the new and existing lines.[7]
Benefit
Expected to promote sustainable mobility by reducing 107,000 US tons of CO_2 emissions by 2030.

Egypt - East Nile Monorail

Overview
Two monorail lines totalling 98.5km with 34 stations.[8]
Benefit
Designed to connect Greater Cairo with emerging urban communities, enhancing urban mobility and accessibility.[9]

So why are governments investing in such transit system projects at scale?

Beyond enabling mobility, transit systems serve as critical enablers of economic growth, environmental sustainability, public health and social inclusion. These wider benefits are central to why governments are investing in such transit system projects at scale. They also mean that safety and security of transit systems should be viewed not as a compliance function, but as a value-protection function.

The more transit systems contribute to economic productivity, inclusion and sustainability, the greater the cost of disruption, insecurity or lost public confidence. The scale of current investment in the UAE, for example, underscores this point. In April 2026, the Dubai Metro Gold Line was announced as a 42km extension with 18 stations across 15 strategic locations, projected to carry 465,000 passengers daily and generate cumulative economic returns of up to 430% over 20 years.[10] As projects of this scale move from ambition to delivery, embedding security and resilience from the outset becomes more important.

Category	Expected benefit	Evidence
Economic	Communities with well-developed public transit systems can attract tourists as well as residents who are seeking to relocate to areas with public transit	In the US, public transit moves 34 million passengers daily, boosting local economies. Every US$10m invested in transit infrastructure generates US$30m in business sales[11]
Environmental	Public transit significantly lowers greenhouse gas emissions compared to private vehicles, contributing to cleaner, more sustainable cities	In Japan, railway expansion has reduced transit emissions by 2% annually, by shifting commuters from road to rail[12]
Health	Transit use encourages active travel, walking to and from stops, which offers secondary health benefits such as increased physical activity	In Tasmania, public transit use led to a 2,000-step increase in daily walking, adding 20 minutes of physical activity. This shift supports healthier lifestyles through more active daily routines[13]
Social	Affordable transit enhances mobility for low-income communities, facilitating access to jobs, education and essential services, helping reduce social and economic disparities	In São Paulo, metro expansion has reduced commute times for low-income residents by 25%, improving access to opportunities and related quality of life benefits[14]

03 Making transit security a strategic priority

Safer systems boost ridership and revenues and enable the mobility necessary to drive economic prosperity.

Safety drives ridership:

Safe public transit systems can boost passenger numbers by up to 20%, as people feel more confident using services they trust, according to the UK Department for Transport.[15]

Safety enables mobility:

Research reveals that transit access impacts employment opportunities – neighbourhoods with greater distance from transit access points face unemployment rates of 12.6%, compared to 8.1% in well-connected areas.[16] Moreover, the World Economic Forum estimates that a lack of safe, accessible transit can reduce female labour force participation by up to 16.5%.[17]

Safety enables reliability:

Crime-related disruptions cost New York's Metropolitan Transportation Authority (MTA) over US$100m annually due to delays, repairs and lost productivity – underscoring the economic impact of unsafe transit environments.[18]

In the next section, we examine the risks that increasingly threaten this value.

04 Key challenges to safety and security

Public transit systems face a unique set of challenges that impact safety and security:

01 **Crowding increases vulnerability:** High passenger volumes, especially during rush hours and at central hubs, increase exposure to crime and disorder, while making monitoring and response more difficult. In dense systems such as Tokyo, handling crowd dynamics becomes a core component of safety.[19]

02 **Expansive networks hinder surveillance and patrolling:** Large, intricate transit systems, like London's 402km Underground, pose challenges for monitoring, especially with multiple entry points and agencies involved, making coordinated security responses difficult.[20]

03 **Antisocial behaviour discourages travel**: In Los Angeles, 62% of female passengers reported experiencing harassment[21] and 97% of women in the UK have experienced unwanted behaviour on public transit, with only 14% reporting incidents to the police.[22] This points to a significant underreporting gap, with actual incidents estimated to be 25-30 times higher than recorded crime levels.

04 **Technology reliance increases cyber and operational risks:** As public transit systems increasingly adopt advanced technologies such as digital ticketing, real-time vehicle tracking and AI-powered surveillance, their exposure to cyber threats also increases.

Disruption is no longer limited to physical incidents. Cyberattacks can interrupt operations, disable systems and affect large parts of the network simultaneously. These challenges show why fragmented approaches to security are no longer sufficient. Managing safety and security in modern transit systems requires a coordinated approach that treats security as a system-level capability rather than a set of disconnected interventions.

05 The DOTS framework

While mitigation measures such as enhanced policing, AI-driven surveillance and public awareness campaigns are already being deployed, their effectiveness depends on being brought together within a structured security framework. Without that integration, responses can remain fragmented, limiting coordination, consistency and overall impact.

PwC Middle East's design, operations, technology and strategy (DOTS) framework aims to create a safe and inclusive public transit system that enables equitable mobility, fosters economic participation and strengthens social resilience by empowering all individuals to move freely and confidently.

Its value lies in linking interventions that are often handled separately, helping transit leaders treat safety and security as an integrated system capability rather than a series of stand-alone responses.

DOTS:

Design:
Design safer spaces with clear sightlines and controlled access to deter crime

Operations:
Operate efficiently through targeted policing and inter-agency coordination for swift incident response

Technology:
Leverage technology, such as AI surveillance and real-time analytics to enhance monitoring

Strategy:
Govern strategically to align safety goals with operational and financial priorities

The enablers

The following components serve as foundational enablers of the DOTS framework: Governance and User voice.

Governance:

Ensures clear accountability, coordinated decision-making and alignment across agencies responsible for transit safety and security.

For example, Dubai ensures robust transit security governance through a formal partnership between the Roads and Transport Authority (RTA) and Dubai Police, structured around the Lifeline Transport Security Committee and four specialised sub-committees overseeing strategy, operations, emergency response and future planning.[23]

Proven impact: This governance model has strengthened incident response, elevated safety standards across all transit modes, and boosted public confidence in Dubai's expanding transit network.

User voice:

Embeds passenger insight into safety planning and operations, ensuring that security measures reflect real-world experience and build public trust.

For example, the National Transport Authority of Ireland placed user engagement at the core of its security strategy by conducting nationwide focus groups and surveys. Over 6,000 passengers and 1,500 adults shared insights on safety perceptions, experiences with antisocial behaviour and expectations for improvement.[24]

Proven impact: These findings directly shaped strategic planning, enabling the authority to tailor safety measures to public concerns and build trust in the national transit system.

06 Understanding the framework

6.1 Design

Design shapes safety long before operations begin. The physical layout of stations, platforms and surrounding public spaces influences visibility, movement, behaviour and response.

In design-led crime prevention, security is embedded from concept to construction through controlled access, clear sightlines, blast-resistant materials and strategic infrastructure placement, guided by technical manuals and liaison officers.[25, 26]

The British Transport Police, in partnership with national security and transit agencies, established architectural standards under the Secure Stations Scheme to elevate safety across UK transit hubs.

Proven impact:
Over 673 accredited stations have reported significant crime reductions:

24%	**decrease in theft**
05%	**reduction in criminal damage**
36%	**drop in vehicle crime when combined with safer parking initiatives**

6.2 Operations

Operations are where strategy, design and coordination are translated into visible safety outcomes.

Effective operations combine visible security presence, intelligence-led deployment and coordinated response across agencies. This includes targeting resources to high-risk locations and times, strengthening collaboration between transit operators and law enforcement and improving the speed and consistency of incident response.

For example, to strengthen transit safety and restore rider confidence, the Washington Metropolitan Area Transit Authority (WMATA) in the US coordinated with local law enforcement and special police officers to increase patrol coverage by 70% across its network[27] and in the UK the British Transport Police trained officers in behavioural detection techniques.

Proven impact:

The enhanced security presence led to a 14% reduction in overall crime, while ridership rebounded, with Metrorail up 24% and bus ridership up 15%, signalling improved public trust in the system.

In the UK, specially trained officers conduct unannounced patrols in railway stations and on trains to identify signs of criminal or terrorist intent. These deployments have proven more effective in detecting criminal activity.[28]

In focus:

BART: Strengthening San Francisco's transit safety through integrated security

The San Francisco Bay Area Rapid Transit District (BART) operates a heavy-rail system across five counties, spanning 131 miles with 50 stations.

The BART Police provide round-the-clock law enforcement to ensure rider safety across the network.[29]

Their aim is to lead in innovative policing, making BART the safest transit system in the country and ensure a safe transit environment, reduce crime through visible presence and proactive enforcement and build public trust through community partnerships.

Core functions:

Law enforcement and patrol: Trains, stations, platforms

Community engagement: Outreach, youth programmes

Crisis response: Homeless outreach, mental health intervention

Investigations and analysis: Crime data, case resolution

Support services: Recruitment, training and wellness

Technology management: Surveillance, digital tools

Key initiatives:

Security enhancement programme enables authorised regional officers to access BART using secure smartcards, increasing police presence

The police explorer programme offers young people (ages 14-21) hands-on law enforcement experience and mentorship[30]

Homelessness action and crisis intervention: Deploys unarmed specialists to connect unhoused individuals with housing, mental health and addiction services

BART watch app: Allows riders to discreetly report incidents in multiple languages via mobile

6.3 Technology

The use of advanced tools such as AI-driven surveillance and real-time analytics to strengthen monitoring, enable rapid incident response and support proactive safety management. Advanced cybersecurity technologies protect digital platforms, secure sensitive data and enhance system resilience against cyber threats. However, public trust requires such systems need to take account of privacy concerns and ensure that any biases are designed out.

Singapore's MRT system integrates AI-enabled surveillance and predictive analytics to proactively monitor passenger behaviour, detect threats and prevent operational faults. Innovations like AI-powered video analytics on the Bukit Panjang LRT and the Overwatch platform enhance safety and reliability.[31]

Australia's rail network piloted an AI-driven violence detection tool that leverages live simulated data to identify aggressive behaviour. During its deployment at Wollongong Train Station (NSW), the tool supported real-time safety monitoring by detecting potential violent incidents.[32]

The table below outlines how next-generation technologies support safety and security across the transit system lifecycle, from planning and entry to monitoring, operations and response.

Technology	Lifecycle stage	Function
AI-based risk intelligence system	Operations	Predictive analytics for operational, safety and environmental risks
Drone as first responder	Response	Rapid response and situational awareness
CCTV with edge analytics	Monitoring	Onboard and station cameras with AI-based behaviour and anomaly detection
Digital twins	Planning	Virtual replica of stations and rolling stock for predictive maintenance and safety planning
Extended reality command and control centres (CCC)	Monitoring	Immersive 3D situational awareness for operations and incident management
Augmented reality-based scanning	Entry and security	Augmented baggage and entry checks for faster, intelligent passenger screening
Centralised CCC platform	Monitoring and response	Unified security platform integrating CCTV, Internet of Things (IoT) and access control for incident response
Light detection and ranging (LiDAR) and electro-optical and infrared	Operations and response	Smart sensors for obstacle detection and track safety in low visibility
AI-based video analytics suite	Monitoring and response	Automated passenger counting, hazard detection and compliance monitoring

6.4 Strategy

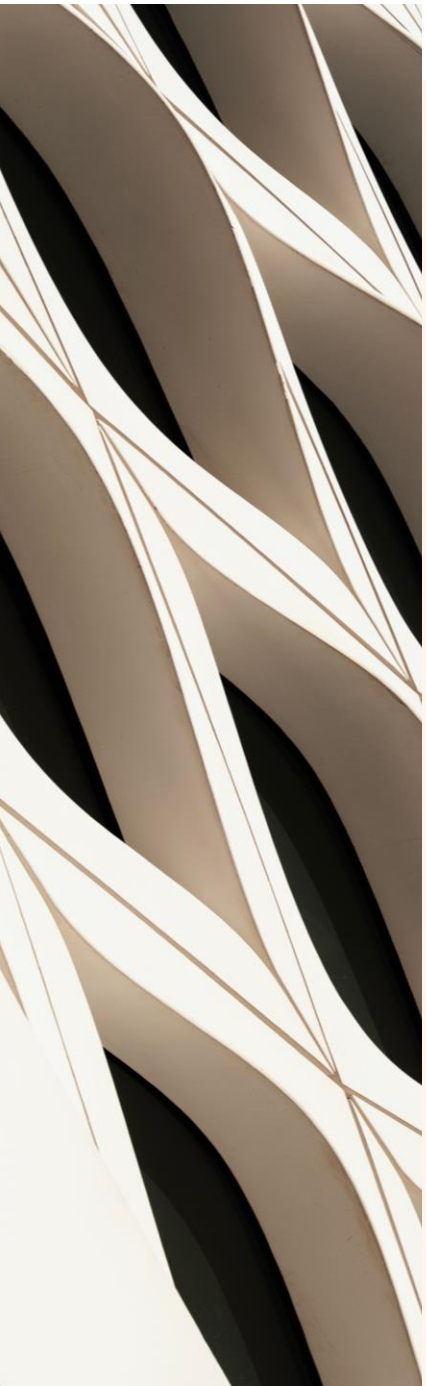
Strategy determines whether safety and security become embedded capabilities or remain a collection of disconnected initiatives. Effective strategy requires coordinated governance, long-term planning and alignment across stakeholders, ensuring that safety is integrated into policy, operations and funding decisions.

The Netherlands, for example, implements a national, multi-stakeholder safety strategy embedded in transit policy, aligning government, police, unions and operators under a unified framework. The strategy combines coordinated enforcement, infrastructure upgrades, digital monitoring and suicide prevention measures to address crime and operational safety risks. Key initiatives include expanded CCTV, bodycams, cashless systems, AI-based train control and a €50m investment in safer rail crossings and anti-trespass measures.[33]

Proven impact: The integrated approach has boosted passenger confidence, reduced incidents on high-risk routes and strengthened emergency response and regulatory oversight across the national transit network.

07 Our perspective: Priorities for strengthening transit safety and security

At PwC, we see security and resilience as strategic enablers for national transformation, not just risk management tools. In the Middle East, rapid urbanisation, ambitious national visions and the evolution of critical infrastructure demand integrated approaches that combine physical, cyber and operational security. Our multidisciplinary expertise and deep regional insight position us to help clients anticipate threats, build local capability and unlock new opportunities for growth.



Based on the DOTS framework, the following six priorities emerge for policymakers, operators and security entities:

01 Treat public transit as critical infrastructure

Transit security should be positioned within national critical infrastructure and resilience agendas, not managed as a downstream operational or compliance issue. This shifts the focus from asset protection alone to continuity, public confidence and national resilience.

02 Create a single security operating model across agencies

As transit systems grow more interconnected, fragmented responsibilities become a strategic weakness. Governments should establish a clear cross-agency governance model that aligns ministries, police, operators and emergency responders around shared accountability, decision rights and response protocols.

03 Embed security into the infrastructure investment lifecycle

Security should be designed into networks from the outset, not retrofitted after delivery. As countries continue investing in new lines, stations and intermodal systems, secure-by-design principles should be integrated into planning, design standards, procurement and assurance processes.

04 Build integrated resilience across physical, cyber and operational domains

Modern transit systems depend on digital platforms, connected assets and real-time operations. Security strategies must therefore move beyond physical protection alone and address cyber risk, operational continuity and incident recovery as part of one resilience agenda.

05 Make public confidence a strategic outcome

Security is not only about preventing incidents; it is also about sustaining trust in the system. Leaders should treat passenger confidence, perceived safety and willingness to use transit as strategic performance outcomes, because insecurity undermines ridership, value realisation and long-term return on infrastructure investment.

06 Shift from reactive protection to intelligence-led security management

As networks scale, security models must become more predictive, risk-based and data-enabled. This means using intelligence, analytics and user insight to prioritise resources, identify emerging threats and adapt security postures in line with changing operating conditions.

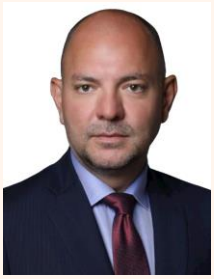
For governments in the Middle East and transit leaders, the next phase of public transit systems will be defined not only by the scale of infrastructure delivered, but by the resilience and trust built around it.

Systems that embed safety and security into design, operations, technology and governance from the outset will be better positioned to protect public confidence, sustain performance and capture the full economic and social value of investment. Transit security is therefore no longer a supporting function. It is a strategic enabler of network success.

References

1. UITP: International Association of Public Transport
2. American Public Transportation Association (APTA): Economic Impact of Public Transit (2020)
3. Royal Commission for Riyadh City: King Abdulaziz Project for Riyadh Public Transport
4. Asharq Al-Awsat: Riyadh Seeks to Ease Traffic Congestion by Launching Metro Project
5. UAE Government: UAE Railway Programme
6. construction week: High speed train project to connect Abu Dhabi and Dubai
7. Arab Urban Development Institute: Doha Metro Project Overview
8. Egypt Today: Egypt Monorail Project Overview
9. Egypt Today: Monorail Developments and Updates
10. Emirates News Agency: Mohammed bin Rashid approves Dubai Metro's Gold Line
11. American Public Transportation Association (APTA): Public Transportation Facts
12. ResearchGate: Railway Expansion Reduces Carbon Emissions by Passenger Modal Shift (1990–2019)
13. International Journal of Behavioral Nutrition and Physical Activity: Transport and Physical Activity Study
14. World Bank: Improving Public Transport in São Paulo (Metro Line 5)
15. ResearchGate: Crime on Public Transport
16. Urban Institute: Upward Mobility Framework: Transportation
17. World Economic Forum: The City Putting Women at the Heart of Mobility
18. WNYC: NY MTA Losing $100 Million Annually to Fare Evasion
19. Metro Ad Agency: Characteristics of Metro Advertising
20. Scientific Research: Tube Trivia and Facts
21. LA Metro: Customer Satisfaction Onboard Survey Results (FY19)
22. Suzy Lamplugh Trust: Personal Safety on Public Transport Report
23. UAE Media Office: RTA and Dubai Police Safety Collaboration
24. National Transport Authority (Ireland): Passenger Personal Security Report 2024
25. UK Government: Secure Stations Initiative Keeping Passengers Safe
26. UK Parliament: Public Transport Safety Evidence Submission
27. WUSA9: Metro Enhances Safety with More Officers and Surveillance
28. British Transport Police: Project Servator Security Initiative
29. Bay Area Rapid Transit (BART): BART Police Strategic Plan 2023–2027
30. Bay Area Rapid Transit (BART): BART Watch Safety App
31. The Straits Times: AI-Based Video System to Improve Commuter Safety
32. University of Wollongong (2020): AI research to aid women's safety on public transport
33. Government of the Netherlands: Safe Public Transport Policy Goals

Contact us



Majdi Dodokh

Defence, Security and Resilience
Lead Partner, PwC Middle East

majdi.dodokh@pwc.com
LinkedIn

Andrew Morley

Policing and Public Safety
Practice Leader, PwC Middle East

andrew.morley@pwc.com
LinkedIn

Professor Andy Newton

Professor of Criminology and Policing,
Department of Criminology and
Criminal Justice (CCJ)

andy.newton@ntu.ac.uk
LinkedIn

Contributors

Shamma Al Faheem

Policing and Public Safety, PwC Middle East

Vishesh Kalia

Public Safety Technology team, PwC Middle East

Oushah Habib

Public Safety and Justice team, PwC Middle East

Ananth Duraiswami

Public Safety and Justice team, PwC Middle East

About PwC

At PwC, we help clients build trust and reinvent so they can turn complexity into competitive advantage. We're a tech-forward, people-empowered network with more than 370,000 people in 149 countries. Across audit and assurance, tax and legal, deals and consulting we help build, accelerate and sustain momentum. Find out more at https://www.pwc.com/.

With over 12,000 people across 12 countries in 30 offices, PwC Middle East combines deep regional insight with global expertise to help clients solve complex problems, drive transformation and achieve sustained outcomes. Learn more at http://www.pwc.com/me.

PwC refers to the PwC network and/or one or more of its member firms, each of which is a separate legal entity. Please see https://www.pwc.com/structure for further details.

pwc.com

© 2026 PwC. All rights reserved