

How mass transit can digitize enterprise asset management



[Digital EAM] can increase the availability of mass transit assets by more than 20 percent ..., reduce the cost of maintenance by as much as 30 percent and increase the productivity of maintenance technicians by more than 25 percent.

Migrating from traditional asset management systems to digital enterprise asset management (EAM) empowers mass transit agencies to go beyond merely satisfying new regulatory requirements — it enables them to begin transforming their organization.

Mass transit agencies that haven't gone the digital route face an uphill battle in their efforts to reduce operational costs, prevent unplanned downtime, reduce maintenance activities and ensure disruption-free operations for their riders.

The physical infrastructure of linear assets, rolling stock and facilities is aging. Consumer expectations for on-time performance and a comfortable user experience are rising. There's budget pressure to reduce capital expenses while maximizing asset utilization. As the workforce ages, the skills gap is growing across all job categories. Many processes are still paper based, yet transit systems have become a popular target for cyber criminals.

As if that weren't enough, new federal regulations require mass transit agencies to develop and implement asset management plans that often lack the objective data necessary to build and sustain them.

Digital EAM is an end-to-end, data-driven approach that enables companies to leverage cutting-edge technologies such as internet of things (IoT), edge computing, robotic process automation (RPA), artificial intelligence (AI) and big data to extract maximum value and performance from the existing asset base. It can increase the availability of mass transit assets by more than 20 percent through predictive maintenance and connected asset life-cycle management. DXC Technology experience shows that when deployed effectively, it can also reduce the cost of maintenance by as much as 30 percent and increase the productivity of maintenance technicians by more than 25 percent.

For example, DXC helped modernize the paper-based operations at Great Britain's Network Rail and facilitated the creation of a mobile-enabled digital workforce, which in turn resulted in a 40 percent reduction in administrative requirements.¹ And in New York City, DXC is working with the Metropolitan Transportation Authority (MTA) to transform its enterprise asset management capabilities. Once deployed, planning, tracking and maintenance of MTA assets and infrastructure along 236 route miles of tracks can be optimized. This will enable the MTA to better predict equipment failures, prevent equipment outages, and quickly repair and maintain equipment, resulting in improved on-time performance and a better experience for 15 million passengers each week.²

¹ Network Rail's mobile-enabled digital workforce, https://www.dxc.technology/travel_and_transportation/case_studies/134369-network_rail_s_mobile_enabled_digital_workforce.

² https://www.dxc.technology/newsroom/press_releases/145950-dxc_technology_selected_by_new_york_metropolitan_transportation_authority_mta_to_transform_asset_management_capabilities.

Transit agencies face new and growing challenges that digital EAM could address

Safety and punctuality measured by the minute are the standards by which all mass transit agencies are judged. However, they are under pressure to modernize and enhance the customer experience amid an environment of limited funding. Here are some of the larger trends affecting the mass transit industry that a digital EAM approach could positively impact:

Urbanization and demographic growth. By 2050, the global population is expected to exceed 9 billion people, with 70 percent concentrated in urban areas. According to an American Public Transportation Association study released in March 2020, the United States has seen a 23 percent increase in population and a 28 percent increase in public transit ridership since 1995.³ Faced with the type of traffic gridlock common in most urban areas, commuters are increasingly looking for a safe, reliable public transit alternative.

The Uber/Lyft effect. The advent of ride-sharing apps has dramatically changed consumer expectations when it comes to public transit. Riders want the same level of convenience and information on a mass transit app as they are accustomed to seeing on their ride-sharing app. Furthermore, consumers want one integrated experience so they can, for example, hire an Uber to take them from their home to the train station, all in one seamless transaction. A digital EAM system could be used by public transportation entities to provide relevant real-time information, such as whether a station is open or closed, so that riders are aware of service exceptions.

Regulations. The industry is being driven to comply with new and tougher regulations. In the United States, for example, the Moving Ahead for Progress in the 21st Century Act (MAP-21, enacted in 2012) for the first time required transit agencies to measure the condition of their systems, set targets for improvement and report on their progress. MAP-21 mandates that asset management systems meet International Organization for Standardization (ISO) standards and requires that transit agencies meet certain repair and safety standards. Digital EAM would enable the visibility of data flows so that transportation agencies can improve their compliance with the regulations.

Sustainability. Environmental concerns are being brought to the forefront of the agenda for mass transit operators by focusing on reducing energy consumption, switching to electric vehicle use, reducing the amount of waste sent to landfills, increasing sustainable energy consumption and production, and using low-carbon and recycled materials without compromising safety and reliability.

Skills gap. The workforce skills gap is another major challenge. In the UK rail system, for example, 40 percent of workers are over the age of 50, and 22 percent of those are over the age of 55. The solution is to address the skills gap by making talent acquisition a high priority and working with schools to build a digital-native workforce. It will be important to integrate EAM-centric knowledge management systems to facilitate the decision-making process more efficiently than traditional systems do.

Security. Security is top of mind for all mass transit agencies. The visibility of mass transit systems and the fact that they rely on legacy control systems, remote control units and SCADA systems makes them a prime target for cyberattack. The threat was made abundantly clear in 2016 when hackers attacked San Francisco's light-rail system, opening all station gates across the network, allowing passengers to travel for free while knocking ticket machines offline and crashing ticketing systems in station agent booths.⁴



³ Source: 2020 Public Transportation Fact Book, APTA, 71st Edition, March 2020 <https://www.apta.com/wp-content/uploads/APTA-2020-Fact-Book.pdf>

⁴ <https://www.sfmta.com/blog/update-sf-mta-ransomware-attack>

How digital EAM can help

Digital EAM can help mass transit systems tackle many of today's challenges. Deploying an effective EAM system begins with benchmarking and analysis, setting up a network to harvest data from disparate sources, then implementing advanced technology such as edge computing. Digital twin technology and RPA can then be used to digitize and automate standard processes to deliver improved operational efficiencies and free up humans to deal with complex issues.

The first step in any digital EAM initiative is to establish baseline benchmarking of the organization's asset management systems. Once the organization gains a full understanding of the scope and condition of its assets, it needs to set realistic and measurable goals for improvement.

There are a wide variety of approaches to benchmarking, as shown in **Figure 1**. For example, at DXC, our experts can perform a comparative analysis against 150 peer mass transit organizations and as many as 122 key performance indicators (KPIs) or key service indicators. This analysis helps identify gaps, pinpoints where improvements can be made, and enables scenario simulation to inform best practices planning and to help create a strategy and roadmap for digital asset management transformation.

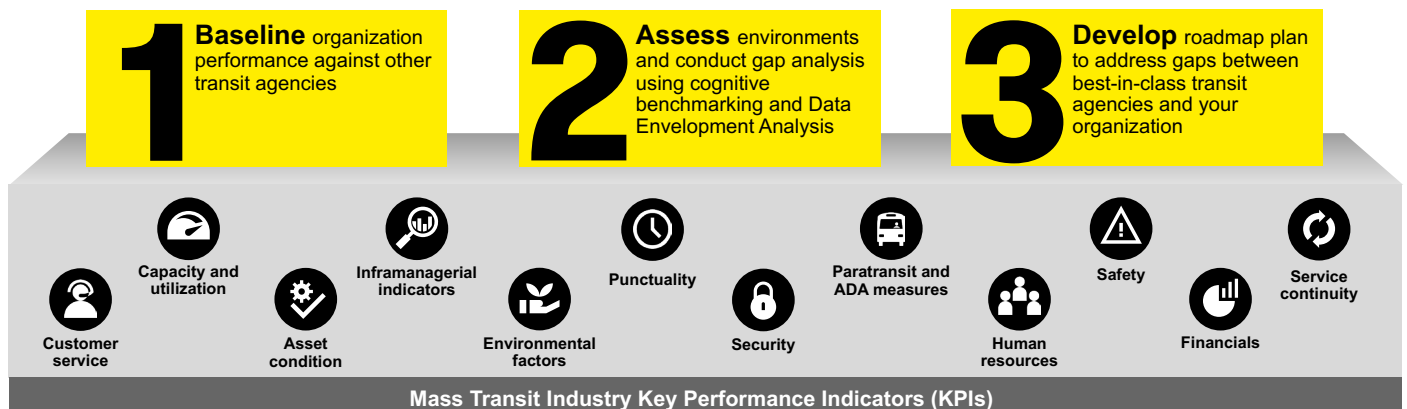


Figure 1. DXC can perform a comparative analysis against 150 peer mass transit organizations and as many as 122 KPIs, to identify gaps and potential areas of improvement.

Data is key to any digital transformation effort, so the next step is setting up a network to harvest data from IoT edge devices, which run the gamut from onboard diagnostics to mobile devices to wearables to video cameras. Since many of the assets that have been instrumented are in motion across a broad geographic area, it's important for an EAM system to have the ability to process real-time data near the source of that data stream, reducing latency and making decisions faster.

Through the deployment of edge computing, transit agencies can apply machine learning technology to gain timely insight into predictive and preventive maintenance operations as close to the data source as possible. With remote tracking and monitoring, real-time data is made available for immediate and actionable insight.

With vast amounts of structured and unstructured data that needs to be aggregated, AI systems can apply decision-making processes to optimize each asset transaction. With AI, companies can more efficiently manage the entire asset life cycle. In addition, historical, offline and batch data are also thrown into the mix and analyzed to spot trends over time and to measure progress and operational improvements.

Next, digital twin technology enables companies to create a digital model of physical assets and processes to simulate, monitor and manage asset performance. With digital twins, organizations can perform “what-if” scenarios in simulation and then analyze the results without having to take the risk of making changes to the actual transit system. Digital twin technology can improve the efficiency of operational and disruption-management systems. It also brings visibility to asset performance operations before there is a physical impact.

The prototype twin becomes a cyber model of all identified assets, so teams can monitor the integrity of connected assets and determine relative impact and gap analysis. For example, integrating the Building Information Model (BIM) and overlaying vital statistical and behavioral data helps simulate actual operations and provides insights to reduce unplanned downtime and improve service availability.

The digital twin technology can also help resolve potential security issues, providing transit agencies with the ability to simulate threats and plan responses by integrating all camera and sensory data into the simulation. It’s important to implement a holistic approach to security that incorporates both IT and operations technology.

Finally, RPA provides multiple benefits for transit agencies. Improving response times for processes such as compliance checks, work order generation and service request updates via RPA from hours to milliseconds helps agencies improve operational cycle times. Automatic identification of issues helps create a more resilient infrastructure when failures do occur. By digitizing and automating processes that were previously paper-driven, employees are freed up to handle more complex service issues.

Along the same lines, a key part of digitizing EAM is empowering employees with mobile technology, wearables and augmented reality/virtual reality (AR/VR). These solutions enable remote field technicians to connect digitally to less experienced workers at the site of an outage and guide them through the tasks required to resolve the problem, and to virtually access the latest work instructions, safety notices or other timely notices.

... implementing digital EAM is just the beginning of the digital transformation journey for mass transit organizations looking to improve service continuity and optimize their maintenance processes. Mass transit agencies need to improve organizational change management processes and make sure there's buy-in and alignment from front-line staff as well as management.

Business benefits of digital EAM

Taking a one- or two-dimensional view of enterprise assets doesn't cut it anymore. Transit agencies need to tear down siloes and create an integrated, multidimensional view of complex assets such as trains, buses and station equipment. A multidimensional view would pull in performance data, failure reports and actual images, as well as real-time data from sensors (usage, temperature, alerts, etc.) to enable predictive analytics with real-time warnings of condition changes and to predict asset and infrastructure failures. Integration of digital EAM systems with the rest of the enterprise, such as human resources, financial and security, is also important.

This enables transit agencies to turn potential disruptions into scheduled tasks and planned maintenance activities. Integrated data enables better and more cost-effective decisions about maintenance, inventory, warranty, uptime, risk management and strategic planning. And, if breakdowns do occur, an intelligent business platform and AI can help troubleshoot incidents more quickly and effectively.

Of course, implementing digital EAM is just the beginning of the digital transformation journey for mass transit organizations looking to improve service continuity and optimize their maintenance processes. Mass transit agencies need to improve organizational change management processes and make sure there's buy-in and alignment from front-line staff as well as management. In addition, getting the most out of digital EAM requires instilling a culture of being proactive rather than reactive. Managers are encouraged to take ownership, establish governance and assign accountability. Then they should share success stories to demonstrate business benefits from newly integrated systems.

Deployed in a measured, strategic manner, EAM can produce significant benefits to mass transit agencies across the globe. Once digital EAM is up and running, organizations will extract additional value from existing assets through AI-based continuous improvement grounded in leveraged actionable insights from real-time data. The many benefits of EAM are not limited to improved operational efficiency. EAM can also keep travelers better informed so they can enjoy more seamless journeys.

Learn more at www.dxc.technology/digitaleam

 **Get the insights that matter.**
www.dxc.technology/optin

About DXC Technology

DXC Technology (NYSE: DXC) helps global companies run their mission critical systems and operations while modernizing IT, optimizing data architectures, and ensuring security and scalability across public, private and hybrid clouds. With decades of driving innovation, the world's largest companies trust DXC to deploy our enterprise technology stack to deliver new levels of performance, competitiveness and customer experiences. Learn more about the DXC story and our focus on people, customers and operational execution at www.dxc.technology.