BY THE NUMBERS:

AI IS THE CENTER OF RAIL INNOVATION

Railway companies increasingly adopt artificial intelligence (AI) technologies to improve operations and attract customers looking for trains that are on time and safe to ride.
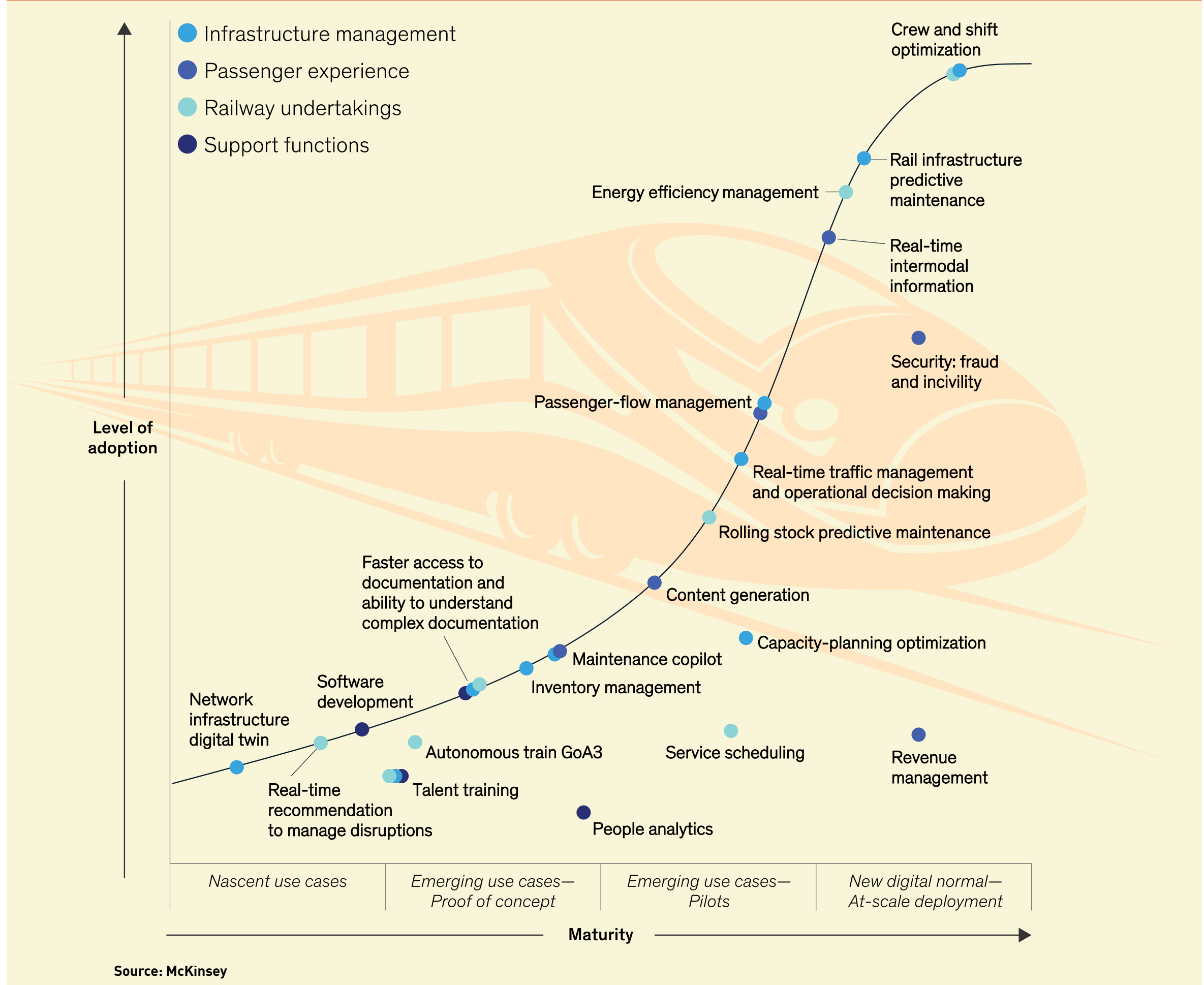
BY CATHY CECERE

The International Union of Railways (UIC) and McKinsey report that affordability, convenience, safety, and dependability are the primary reasons passengers chose to travel by train. So it makes sense that, as the cost of data storage and processing goes down, AI has become a viable choice for rail to analyze and predict outcomes and influence travelers' choices.

And while rail companies use AI to improve the customer experience makes understandable safety comes first and an anticipated impact of $22 billion in savings annually because of AI implementation is equally persuasive.

Equally impressive is that all this is happening in an industry that's slow to adopt technology and digital solutions, operates in a market that is heavily regulated, and has issues with data quality. Yet despite these challenges, UIC reports, about 25 percent of rail companies have already implemented AI at scale across multiple use cases, while the remaining firms are either in the initial stages of development or are working on trial projects.

ADOPTION OF AI USE CASES BY MATURITY LEVELS BEING APPLIED BY RAILWAYS

Level of adoption

- ● Infrastructure management
- ● Passenger experience
- ● Railway undertakings
- ● Support functions

Crew and shift optimization
Rail infrastructure predictive maintenance
Energy efficiency management
Real-time intermodal information
Security: fraud and incivility
Passenger-flow management
Real-time traffic management and operational decision making
Rolling stock predictive maintenance
Faster access to documentation and ability to understand complex documentation
Content generation
Capacity-planning optimization
Maintenance copilot
Inventory management
Software development
Network infrastructure digital twin
Autonomous train GoA3
Service scheduling
Revenue management
Real-time recommendation to manage disruptions
Talent training
People analytics

| Nascent use cases | Emerging use cases—Proof of concept | Emerging use cases—Pilots | New digital normal—At-scale deployment |

Maturity

Source: McKinsey

RAILWAY COMPANIES ENGAGING WITH AI, AND THE LEVEL OF DEPLOYMENT

- Early development, no pilots — 25%
- Several ongoing pilots — 13%
- First at-scale deployment, building internal capabilities — 38%
- Several at-scale deployments, with internal capabilities in place — 25%

0% 5% 10% 15% 20% 25% 30% 35% 40%

Source: UIC survey of 11 railway companies across Europe and Asia, June to November 2023