

# How digital twins could accelerate rail's AI journey

May 6, 2026



*Emu Analytics' digital twin software delivers a single operational view to keep transport operations flowing. Dynamic and visual, it has already been adopted by transport operators like LNER and British Airways.*

*In this Guest Writer article, Chief Product Officer Jon Smith explains that digital twin software isn't just enabling these operators to make smarter, faster decisions – it's laying the foundations for artificial*

*intelligence (AI).*

Today, AI is ubiquitous. It's being discussed in boardrooms, at industry events, and on shop floors. It's even on our smartphones; who hasn't consulted a Chatbot or used AI to re-draft a particularly important email?

And it's true that this technology has the potential to transform train operations. It could support predictive maintenance, minimise the impact of disruption, or optimise timetables. Little wonder business leaders are eager to embrace it.

But, before doing so, they must address two fundamental questions. Firstly, what problem are they trying to solve? And secondly, what components must be in place to ensure AI can solve it?

Because this technology is only as good as the data that feeds it. We've all heard horror stories - the businesses that planned their entire sales strategies with AI, only to find it had hallucinated after being fed incorrect or contextless data.

Without well-known data and processes, organisations won't feel the true benefits of AI. And rail - a complex system with myriad data points - presents a unique challenge.

## **Making sense of a complex system**

It's about establishing a solid data foundation - something digital twin technology (like Emu Analytics' software) can help to deliver.

In the context of rail operations, a digital twin is a representation of a live system. It shines a light on every aspect of this system, from trains to tracks. It can be historical, showing what happened at a specific point in time - or predictive, indicating what might happen in the future.

And it differs from traditional tools, which often serve a single purpose. They might look at data on a very specific aspect of rail operations - crewing or safety, for example. A digital twin spans all these systems and data points. It collects data, makes sense of it, cleans it, and saves it so it can be performantly queried by a user.

In short, a digital twin pulls together disparate data points from what is, in reality, quite a heterogeneous system. There are points coming from trains - think data on engines, cabin temperatures, telematics, and passenger numbers. Then, zooming out, there's data on the track, the signalling infrastructure, even the weather... In rail, there are so many data points, and digital twins are designed to make sense of them. Not to replace master systems, but to transplant a layer of insight above them, enabling operators to make decisions quickly and efficiently.

In short, digital twins reduce operational friction, bringing together data from multiple master systems. They make sense of all the parts as a whole, which is essential - because if users don't understand the whole, they can't make decisions that have a positive impact on operations. And they certainly can't make predictions about the system using AI.

## **Improving safety and customer experience**

Digital twin technology can help the industry get AI ready. But, first and foremost, this software serves as a digital backbone for organisations.

To create a digital twin, operators must first get to grips with their data, establishing whether it is complete and accurate. And they must understand their operational processes, which might be ill defined or inefficient. Once this foundation is in place – accurate data and well-defined processes – a digital twin can be layered above it.

And, in the control room, a real-time digital twin makes all the difference. The transport sector often relies on skilled users, who – thanks to decades of experience – have a sense of how systems work and when to act. But when these users leave the sector, they take their insights with them.

A digital twin can help. It provides just the right amount of information at the right time, supporting agile decision-making. And more than that, it bolsters a team's capabilities, pulling data from a range of platforms and translating it into usable insights – which could be as comprehensive as 'the 9.30 train to York is delayed by 40 minutes, impacting 120 passengers at York, including four passengers requiring assistance to disembark, conditions are icy'. It means teams need no longer rely solely on the knowledge and instincts of a handful of expert users.

In this way, a digital twin can support the key tenets of the transport sector – safety and customer experience. Because quick decisions and real-time insights mean smoother, safer journeys for passengers. Its predictive capabilities, meanwhile, enable operators to anticipate and address issues before they arise.

## **Accelerating the AI journey**

And ultimately, it creates a solid foundation for AI. Because if you layer this technology over unrefined processes and inaccurate data, it's likely to generate unrefined or inaccurate answers. They could be wrong, but convincingly so.

With the right foundation, however, AI can deliver transformative results. In aviation, it's already being used to create tailored customer experiences. Operators can inform passengers of issues in advance – confirming that, while their original flight has been cancelled, they have been booked on another. Rail could take a similar approach, using AI to mitigate disruption before customers are even aware of it.

It's an exciting time for the transport sector – particularly rail. So much good could come of this technology, and we're keen to support operators as they embrace it. We're not here to deter them from using it; we want to help them lay the right foundations, accelerating their AI journey.