

Artificial Intelligence in Rail: The Industry Action Plan



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Foreword

The railway is a system with a very long memory. Much of our infrastructure is over a century old; rolling stock lasts decades, and the standards and cultures that keep the railway safe are deeply embedded. That durability is one of the railway's great strengths, but it also means change is inherently gradual.

Artificial intelligence is the most consequential technology of our time and is advancing far more quickly than the railway traditionally does. That creates a real challenge for a safety critical system like ours, but it also presents a significant opportunity. Used properly, AI can help us understand our network better, make more informed decisions, and improve how reliably we run services for passengers and freight.

The railway has always been about enabling growth. Since the first public passenger railway opened two hundred years ago, it has supported urbanisation, economic activity and social connection. Government continues to invest in rail because we need the railway to deliver these outcomes effectively and support growth.

Improving how the railway works is difficult in a system that has been fragmented for many years. That is precisely why GBRX has been created at this point of reform, as we bring track and train closer together, to engage seriously with strategic technologies that can improve how the railway works for people and help create sustainable skills for the future.

What matters most to passengers is straightforward. They want a railway they can rely on, that they can trust with their time and money, and that does what it says it will do. The same is true for freight customers, for whom reliability, predictability and confidence in the network are essential to supporting growth.

AI can help deliver this by giving us a far richer, more dynamic understanding of how the railway actually operates day to day, not just how it is planned to operate. It allows us to see patterns across the system that are difficult to identify through traditional practices alone, such as how small, unattributed delays accumulate, how decisions in one part of the network create consequences elsewhere, and where targeted intervention will have the greatest impact. Crucially, this understanding can be turned into action. By augmenting the judgement of leaders in a more integrated railway, AI can support better planning, faster responses to emerging issues, and more confident decisions, grounded in evidence rather than hindsight.

“ this AI Action Plan will help accelerate our ability to deliver a more capable, reliable, resilient railway ”

This must always be done safely. The railway cannot take risks with safety, but it is also right to challenge long standing assumptions where better evidence allows us to do so. AI can help us test whether current parameters and practices are delivering the outcomes we intend, rather than relying solely on what is familiar.

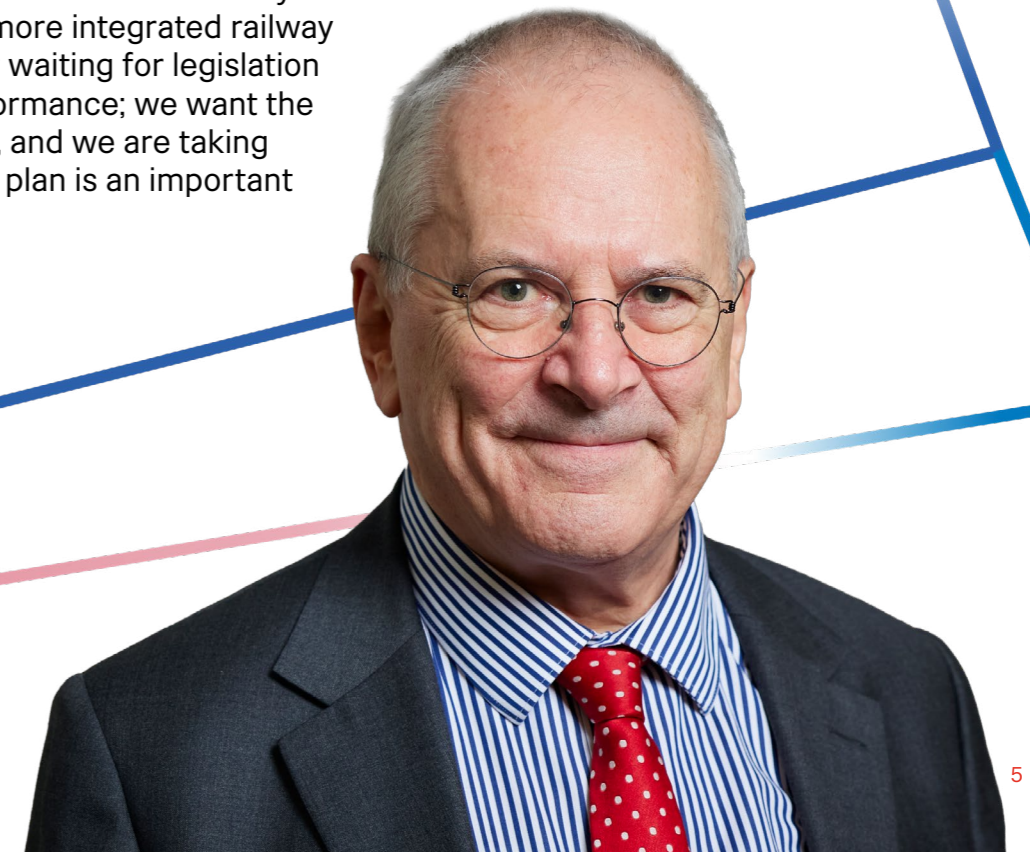
This action plan sets out a practical, bottom up, industry approach to advancing AI. It recognises the complexity of the system, the responsibilities of different organisations, and the need to move at a pace that is both ambitious and responsible. It focuses on putting capability into the hands of the people who plan, operate and maintain the railway, and on building skills for the future.

The establishment of Great British Railways will deliver a simpler, more integrated railway for people. We are not waiting for legislation alone to improve performance; we want the railway to work better, and we are taking steps now. This action plan is an important part of that.

I am delighted by the breadth of industry participation and support of an expert AI advisory council that has contributed to the development of this action plan and the establishment of the sector's first Artificial Intelligence Incubator Accelerator to coordinate its delivery.

The discipline and urgency set out in this AI Action Plan will help accelerate our ability to deliver a more capable, reliable, resilient railway that continues to serve the country well for generations to come.

Lord Peter Hendy
Minister of State for Rail



Executive summary

This action plan marks an important step in how the railway sector approaches the adoption of artificial intelligence. AI capability is advancing rapidly, and its application within complex, safety critical industrial systems requires deliberate design, coordination and sustained effort. This plan provides a structured, sector specific approach that reflects how the railway operates in practice and how change is delivered safely.

The railway is operating close to the limits of its system capability. Demand pressures, constrained capacity and persistent cost challenges sit alongside significant workforce demographic change. Over the coming decade, these conditions will shape how the network is planned, operated and maintained. They define the environment in which new technology must be introduced, embedded and trusted. Addressing these pressures requires changes in how understanding is generated, and how decisions and actions are made across the system.

The purpose of this action plan is to align the sector around industry foundations that support safe and scalable AI adoption and accelerate delivery. It provides a common framework for action across organisations while preserving operational ownership. The focus is on system level enablement, recognising that many of the highest value opportunities and foundations span organisational and functional boundaries.

Orchestrated action is the organising principle of the plan. Fragmentation across track and train, assets and operations, and public and private organisations fundamentally shapes how technology is adopted in the railway. Alignment on data, governance, capability and delivery approaches create adoption pathways that enable organisations to act with greater confidence and pace. This plan provides the mechanism for that alignment.

Delivery follows a federated model. Business adoption of any technology inherently sits with the organisations that plan, operate and maintain the railway, public and private, reflecting their operational accountability. Sector coordination is applied purposefully, where industry imperatives or delivery capabilities for foundations, interoperability, assurance and pathfinders are required to create pathways for safe and scalable adoption across the system.



Artificial intelligence refers to a family of computational technologies built on inference centred analytical techniques that strengthen prediction, decision support and coordination. In the railway context, these techniques support situational understanding, improve decision quality and reduce unnecessary operational burden when integrated with data, processes, assurance and professional judgement.

AI functions as an enabling capability within the system. Value emerges when analytical inference is embedded into the work of the people who plan, operate and maintain the railway.

The plan identifies a set of opportunity areas where AI can deliver meaningful benefit. These include passenger and customer experience, network operations, network planning, rolling stock asset management, infrastructure asset management and enterprise level applications. These areas reflect where improved understanding, prediction, decisions and actions can strengthen reliability, efficiency and service quality.

Scaling AI across these opportunity areas depends on a set of shared foundational enablers. The plan focuses on strengthening data infrastructure and integration to enable consistent access to trusted data across organisational boundaries. It addresses governance, ethics and assurance to align AI adoption with existing safety and regulatory frameworks. It recognises the importance of commercial and procurement models that support reuse and collaboration. Workforce capability, skills and confidence are treated as central to adoption. Strategic partnerships and compute capability support the development and deployment of models that can operate at system scale.

Progress is achieved through purposeful and focused pathfinders. Pathfinders operate in real environments and address operational, engineering or customer realities. They generate evidence, reusable artefacts and delivery patterns that inform wider adoption. This approach supports disciplined learning, prioritisation and decision making, reducing the risk of isolated activity that does not translate into sustained capability.

Implementation is structured across three horizons of impact that operate in parallel. There is the acceleration of existing solutions with proven value, the strengthening of shared enablers for adoption, and incubation through first principles pathfinders that deepen understanding of where AI can be applied effectively and what is required to support scale. Continuous evaluation supports prioritisation and adaptation as experience develops over time.

GBRX has been established to address barriers to technology adoption that require strategic and purposeful action across the sector. To create the capability for sustained delivery within a rapidly developing field of AI technologies, GBRX has founded the sector's first Artificial Intelligence Incubator Accelerator (AIIA).

AIIA acts as the custodian of this action plan and its implementation by orchestrating activity across the sector. It provides a convening point for incubation, coordination, learning and capability building, supporting federated delivery. It advances work on sector data, skills and workforce development, including the mobilisation of data and AI apprenticeship pathways.

AIIA's objectives are governed by a sector executive sponsorship group. This sponsorship will provide executive leadership to drive pathfinders and create the business pathways for adoption and scale.

The plan has been developed through extensive engagement across the railway sector and expert challenge through the AI Advisory Council.

This engagement has shaped its priorities, scope and delivery approach. Delivery activity is already underway across data, skills, incubation and early pathfinders. The action plan provides the required structure for this work to accelerate.

Success will depend on disciplined implementation and learning. Progress will be achieved through pathfinders and a purposeful set of shared indicators focused on outcomes, reuse and sustained adoption. The plan is designed to evolve as evidence and experience develop, supporting responsible AI adoption grounded in operating realities of the railway.

1. Context

1.1 Purpose

The creation of Great British Railways coincides with a period where artificial intelligence is advancing at remarkable pace. The convergence of these shifts makes this a consequential moment.

This is a railway sector wide action plan. Its purpose is to provide a clear, bottom up, sector specific framework for the safe and scalable adoption of artificial intelligence across the railway industry. The plan is designed to support meaningful progress by aligning activity across organisations around common enablers, delivery methods and priorities, while preserving operational ownership.

Many high value applications of AI and their foundations span organisational and functional boundaries. The sector level framework provides a common structure for action, learning and adaptation as experience develops, enabling the sector to strengthen capability and move toward AI technologies with confidence.



Artificial Intelligence is set to play a defining role in every aspect of our lives and this Government, as part of its Plan for Change, is ensuring transport is at the forefront of this technological revolution - unlocking new opportunities for growth, supporting safety, and creating a network that works for everyone.”

Lord Peter Hendy
Rail Minister



1.2 Line of sight

The UK Government has published policies and plans that set the national priorities for AI capability, skills, data and application, including across transport. They establish the context and ambition in which this plan has been developed.

The railway operates within a distinct system environment. Long asset lives, distributed organisational and safety responsibilities shape the reality of how AI is applied. This plan provides the sector specific pathways that translate national policy into sector action with a focus on the foundational enablers, coordination and delivery methods required to advancing the UK Government objectives.



With billions invested by technology companies, commoditised AI will quickly become more prevalent. However, the application of industrial AI in safety critical environments is not inevitable and requires strategic, purposeful action. Significant demographic change is forecast, and this will play a major part in how we develop skills for the future.”

Toufic Machnouk
Managing Director, GBRX



Alignment of UK Government, DfT, and Rail AI Action Plans

The table below summarises how national AI policy intent is translated through transport stewardship into rail specific delivery mechanisms.

UK Government AI Opportunities Action Plan	DfT Transport AI Action Plan	Artificial Intelligence in Rail: The Industry Action Plan
Leadership & Governance		
Responsible and safe AI adoption. Enabling conditions for trust. National ambition and public value.	Responsible AI leadership in transport. Clear accountability and oversight. Guidance and coordination.	<ul style="list-style-type: none"> Proportionate risk based governance. Lifecycle assurance (monitoring, drift, retraining). Integration and alignment with existing frameworks.
Skills & Talent		
Workforce reskilling for AI. Preparing for labour market change. National capability growth.	Transport AI skills development. Training, secondments and communities of practice. Sector capability uplift.	<ul style="list-style-type: none"> Role based AI literacy. Sector capability baselining. Targeted skills and apprenticeship pathways.
Infrastructure & Data		
Secure compute and data access. Modern digital foundations. Enabling AI innovation.	Transport data and infrastructure enablement. Better use of shared data assets. Support for AI deployment.	<ul style="list-style-type: none"> AI ready rail data and architecture. Secure, federated access. Alignment to national standards and assurance of data dependencies.
Application & Adoption		
Adoption of AI to drive productivity. Public service improvement. Responsible scaling.	Identification and support of high-value AI use cases. Steering adoption across transport. Sharing learning.	<ul style="list-style-type: none"> Coordinated pathfinder led delivery. Federated delivery. Build out / build across approach.
Engagement & Confidence		
Market development and collaboration. SME participation. International partnerships.	Stakeholder engagement. Building public confidence in transport AI. Cross sector learning.	<ul style="list-style-type: none"> Coordinated sector engagement and shared learning through sector's AI Incubator-Accelerator. Transparent communication. Confidence with regulators, workforce and suppliers.

1.3 Industry environment and ecosystem

The railway operates as a complex, safety critical system in which customer, operational, engineering and workforce activities interact across organisational and functional boundaries.

The sector is inherently large and complex with responsibilities distributed across train, freight and open access operators, Network Rail, rolling stock owners, suppliers, industry bodies and the regulator.

The railway also has high thresholds for change. Safety, network regulation, long asset lives, procurement regulations, and workforce considerations introduce necessary discipline into how new capability is adopted. Frontier technical capability is inherently scarce across the sector

The formation of Great British Railways will establish significant integration and strategic clarity, enabling a purposeful approach to how change is coordinated across track and train, and public and private organisations. These factors define the environment in which strategic technologies such as AI are delivered.

The interconnected railway ecosystem can be understood in five system themes.

Passenger & customer experience

Activities that shape how passengers and freight customers experience the railway, including journey information, ticketing, accessibility, disruption communications and service provision at stations and on trains. Passenger operators, open access operators and freight companies each play a role in delivering a consistent and reliable customer experience across the network.

Network operations

Functions that run the railway day to day: real-time control, incident response, performance management and the processes that support service delivery. These activities require close coordination across operators, Network Rail, freight operators and industry bodies responsible for assurance and oversight.

Network planning

Activities that determine how the network is configured and used, including timetable planning, capacity analysis, capability modelling and long-term operational planning. These functions depend on collaboration across operators, Network Rail and the wider supply chain to balance demand, performance, freight needs and engineering access.

Asset management

Management of the physical railway and rolling stock, covering track, signalling, structures, power systems, trains and associated assets. This includes inspections, maintenance, renewals and long-term asset strategies. Responsibilities span Network Rail, ROSCOs, operators, maintainers and supply chain partners who ensure assets remain safe, reliable and available.

Workforce & skills

Competence, training and workforce development across operational, engineering and customer facing roles. This also includes the business processes and organisational systems that underpin safe and reliable delivery. Operators, Network Rail, training providers, suppliers and industry bodies each contribute to strengthening workforce capability.

1.4 Why AI and why now

The railway faces several sustained pressures that expose the limitation of how the system is planned, operated and maintained. These are secular trends that are not easy to solve without systemic technology shifts.

→ **Demand for passenger and freight services is near the limits of the systems' capabilities.** The network operates with limited headroom amplifying effects of complexity. Small incidents can escalate quickly, placing increased pressure on operations, timetable planning and maintenance.

→ **A significant proportion of the workforce is approaching retirement,** placing essential operational knowledge and technical capability at risk. Analysis by the National Skills Academy for Rail (NSAR) indicates the industry is losing 5% of the workforce to retirement every year and only replacing this at a rate of 1.5%.

→ **The railway has embedded fiscal constraints.** Office of Rail & Road (ORR) analysis suggests industry productivity is around 25% lower than a decade ago. Public funding also competes with wider national priorities, even as ridership and revenue continue to recover.

AI technologies are highly consequential when integrated into operational, engineering and planning processes. AI strengthens understanding, prediction, decisions and actions across a system, enabling earlier intervention, better use of operational knowledge and better leveraging of constrained resources.

AI has become viable for the railway due to three developments. The growth in operational data across several domains, advances in high performance computing to train and run complex models, and expansion in models that can address a wider range of problems.

“ Artificial intelligence is a family of capabilities, from predictive learning and optimisation, through generative models that can create and synthesise, to agentic systems that can act on our behalf. Its momentum is undeniable globally and we are seeing some fast moving developments with those who are taking adoption seriously: these organisations are moving experimentation into mission critical deployment.

For complex industries like rail to benefit from this transformation, we must create the conditions for scale. Leadership commitment, robust data, resilient architecture, clear accountability, continuous skills development and governance that drive trust and adoption, not just proofs of concept.”

Ismail Amla
Technology Executive & Railway Industry Non-Executive Director



1.5 AI overview

Artificial intelligence is a family of computational techniques that derive inferences from data to inform or automate decisions. Traditional software follows defined logic, whereas AI is probabilistic in nature, meaning outputs represent best estimates based on the data the system has seen.

AI can strengthen understanding, generate predictions, make decisions, and take actions. In the railway context, these techniques support situational understanding, improve decision quality, and reduce unnecessary operational burden when integrated with data, processes, assurance and professional judgement.

AI is an enabling capability within the system. The value of this technology is realised when inference is embedded into everyday workflows of the people who plan, operate and maintain the railway, shaping how those workflows operate and how they are sustained over time.

As with other technologies, early hype grows faster than practical application, before capability settles into meaningful use.

This is often described as Amara's Law, which observes that the near-term impact of new technologies is frequently overestimated, while their longer-term value is underestimated. For the railway, this reinforces the importance of focusing on the conditions for sustained adoption, rather than reacting to short-term expectations.

As AI becomes embedded in workflows and operating arrangements, it changes how decisions are made, information flows, and work is structured between people and systems. This requires deliberate design and ongoing oversight to ensure AI enabled workflows remain effective over time.



There is a huge opportunity in the adoption of AI technologies. Our challenge is pace. If we are not careful, we can miss a wave, and it can be hard to catch up. The railway faces pressures that require new ways of planning, operating and maintaining the system. These pressures make the case for coordinated and purposeful action now.”



Jeremy Westlake
Chief Executive, Network Rail

→ These techniques are suited to different types of challenges, which include:

Classical machine learning which uses historical and real-time data to detect patterns, classify information or make predictions.

Optimisation and simulation which support complex decisions by identifying efficient options or modelling system behaviour.

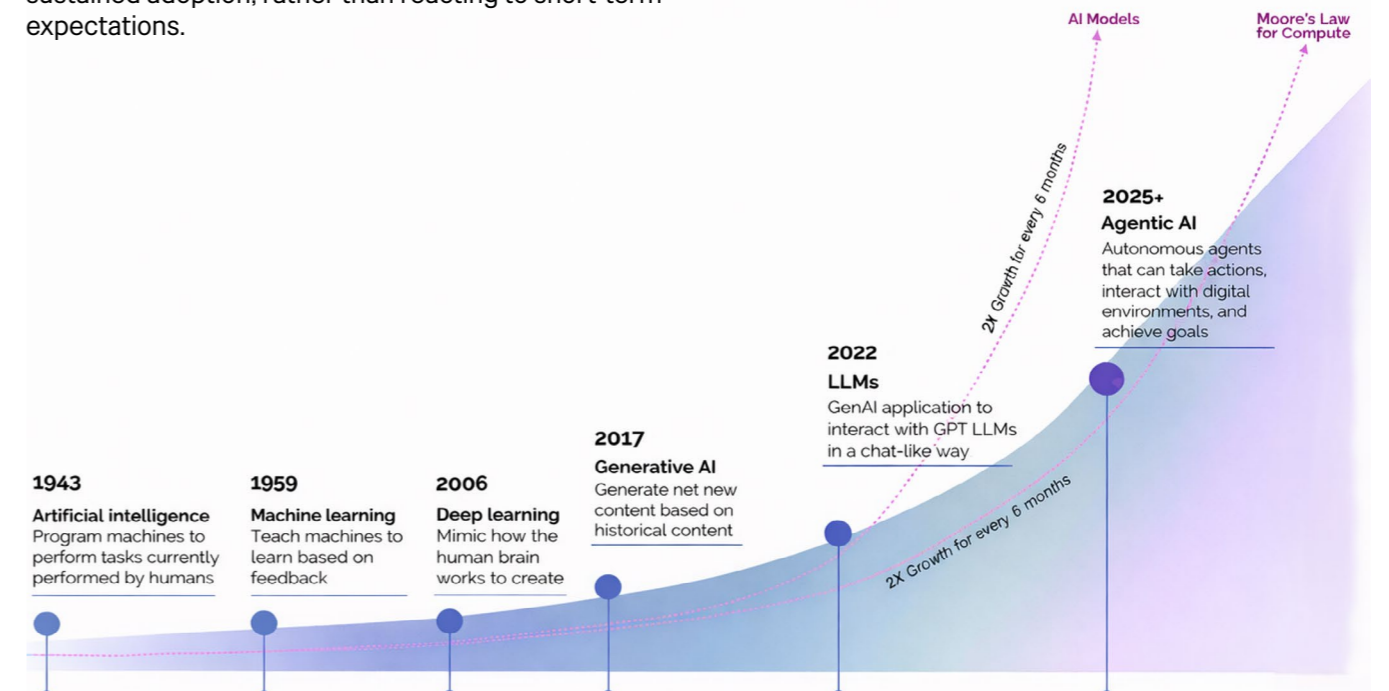
Natural language processing which analyses and generates human language, often using deep learning models and large language models.

Generative AI which creates or summarises content including text, code, images and audio, often powered by large language models.

Computer vision which interprets images and video using techniques such as neural networks to recognise objects or detect anomalies.

Agentic AI where systems pursue defined objectives by sensing their environment, reasoning about options, planning actions and adapting over time within defined rules and human oversight.

AI has been applied in several fields for many decades as computational capabilities advanced. More recently it has become present in a diversity of consumer settings, such as online recommendations, credit scoring, fraud detection, navigation tools, customer service systems, and virtual assistants. The release of ChatGPT and other Large Language Models (LLMs) in 2022, expanded the access and exposure to the possibilities of AI technologies. This has raised expectations societally and across many sectors.



→ **Agentic AI** is transformational in complex, distributed operational environments such as the railway. They can observe, decide and act across multiple steps to achieve defined goals. In rail, they support the coordination of complex, cross system workflows by linking data, decisions and actions across infrastructure, operations and services. Deployed within defined boundaries and assurance frameworks, they help manage interdependent activities while keeping accountability with people.



Improving our data hinterland and making the most of a single organisation to take custody and open it up is powerful and will allow us to leverage that capability to fundamentally improve how the system works for people.”



Richard Goodman
Director General Rail Reform & Strategy, Department for Transport

1.6 The role of GBRX



That's exactly why we created GBRX, to challenge and accelerate change - to break the pattern of slow adoption that has historically held our railways back. GBRX is our solution to overcoming these barriers, helping to modernise the railway faster and embrace new technology more effectively. GBRX is here to make that happen, operating under Shadow GBR for now and eventually as part of GBR itself."

Lord Peter Hendy
Rail Minister



GBRX is the railway's strategic innovation body, established to address barriers to the adoption of strategic technologies that improve how the railway works for people and create sustainable skills for the future.

Its role is to create new pathways for technologies such as AI, where adoption and scale face systemic barriers requiring strategic capabilities and purposeful actions. For the development and delivery of the AI action plan, the body has activated strategic sector capabilities.

To develop this plan, it has established an AI Advisory Council to provide expert direction and challenge within which the sector was convened. This brings together train and freight operators, Network Rail, ROSCOs, suppliers, RSSB, ORR, industry bodies, government departments and technology experts.

To deliver this plan, it has established the sector's first Artificial Intelligence Incubator Accelerator (AIIA). AIIA provides the expert capability required for orchestrated delivery across the sector organisations through a federated model, where organisations are enabled to act in their areas of responsibility.

1.7 Sector roles

The rail sector contains a diversity of organisations that plan, operate, maintain, regulate and support the railway. As GBR reform establishes new structures, revised or additional organisations will be incorporated as the specifics of their roles become clear.



Rail is not a system that naturally absorbs change. AI exposes that reality – but it also creates a chance to rethink how the industry operates, grows revenue, and delivers long-term value. Getting this right is not optional if the railway is to become more resilient and financially sustainable."

Alex Hynes
Chief Executive, DfT Operator Ltd



UK Government

Department for Transport, Department for Science and Technology and other departments

Government sets the policy, regulatory, funding context in which AI adoption takes place and supports alignment between sectors. The Department for Transport (DfT) acts as the primary sponsor for the railway, setting strategic objectives, defining policy, providing funding, and delivering reform towards GBR.

The Department for Science and Technology (DSIT) provides national leadership and funding for research and innovation, enabling cross-sector learning and capability development that sectors including rail can draw on. Business-focused departments support the strength and competitiveness of the supply chain, innovation ecosystems and skills base. Together, these roles help advancements in AI align with public value, national policy and the system responsibilities.

Railway operators

Network Rail, DFTO and other Train Operating Companies, Freight Operating Companies and Open Access Operators

These organisations run the railway every day and are responsible for the adoption of technologies like AI into operational, engineering, customer facing and asset management activities. Their role includes data stewardship, enabling operational and asset data to be curated, assured and made available for model development.

They support pathfinder activity and scaling, offering live environments to test, refine and integrate AI safely, and they contribute operational expertise, so solutions remain grounded in real working conditions.

These organisations, particularly when under private or independent ownership, will also deploy and adopt their own AI solutions, building capability that responds to local operational needs while aligning with the sector wide direction set out here. They lead the integration of AI tools into processes and workforce practice, enabling people to use AI supported tools confidently and responsibly. Through these actions, they make adoption visible on the network and demonstrate how AI can strengthen performance, reliability and customer experience.

ROSCOs

Rolling stock companies including OEMs operating under train leasing or availability style arrangements

Rolling stock companies play a central role in enabling AI adoption in rolling stock and fleet related domains, through their position as asset owners and long-term custodians of fleet data, upgrade cycles and contractual frameworks. In practice, this includes traditional ROSCOs and OEMs operating under leasing or availability-style arrangements, where responsibility for asset condition, diagnostics and system upgrades sits over the life of the fleet.

Their role includes providing access to structured, reliable asset and system data from fleets, components and onboard systems, and supporting the validation and assurance of AI enabled tools that interact with rolling stock decisions. ROSCOs work with operators, maintainers and suppliers to support pathfinder delivery, enabling testing in operational settings while maintaining clear accountability for asset integrity, safety and long-term performance.

ROSCOs also enable modernisation and targeted investment by aligning retrofit programmes, sensor deployment and upgrade decisions with long-term asset strategy. Through these actions, they help ensure approaches are scalable, interoperable and sustainable across fleets, rather than driven by isolated or short-term deployments.

The supply chain

Manufacturers, OEMs, SMEs, technology providers and service partners

The supply chain provides the technical capability and integration expertise required to design, build and deploy data driven tools and decision support solutions across the railway. This includes developing models, platforms and analytics suited to rail operating conditions, safety expectations and data constraints, and integrating them into existing systems and workflows.

Suppliers contribute to pathfinder delivery by working alongside industry partners to develop, test and refine solutions in live or representative environments. Their role is particularly important in translating emerging capability into repeatable, supportable products and services that can be assured, maintained and deployed at scale, rather than remaining bespoke or site specific.

Industry and standards bodies

RSSB, RDG, NSAR and other professional bodies

Industry and standards bodies provide the frameworks, coordination mechanisms and shared practices that enable AI to be introduced safely, consistently and at scale across the railway. Their role includes developing, maintaining and embedding standards, assurance approaches and interoperability frameworks that allow data, models and systems to be trusted, transparent and aligned with good practice.

They support cross-operator and cross organisational alignment by clarifying expectations, reducing ambiguity and enabling consistent approaches to safety assurance, customer facing processes, technical interfaces and data conventions. Through this role, they help reinforce system wide safety, interoperability and customer experience.

Trade bodies and professional institutions

RIA, Rail Forum, Rail Freight Group, ITS UK and professional institutions

Trade associations bring together suppliers of all sizes, advocating for innovation, supporting capability development and enabling SMEs and larger companies to contribute to AI adoption in a coherent and structured way. Professional institutions strengthen research, evidence and workforce capability, helping the sector understand emerging risks and opportunities and supporting the development of the skills needed to use AI responsibly.

The regulator

Office of Rail and Road

The Office of Rail and Road provide independent oversight of safety, economic regulation and compliance across the network. Its responsibilities include regulation of change assurance for new tools, processes and technologies to meet statutory obligations and support safe, reliable railway operations. ORR also provides oversight of risk and governance, assessing how changes interact with safety management systems, asset integrity and workforce competence.

Alongside this, ORR maintains economic and performance regulation, monitoring the impact of change on efficiency, value for money and the delivery of passenger and freight services. As AI capabilities mature and are adopted across the sector, ORR's role will continue to evolve to ensure that regulatory expectations remain clear, proportionate and aligned with the safe and responsible operation of the railway.

Trade unions

ASLEF, RMT, TSSA and others

Trade unions represent the workforce across the sector and support safe adoption of new technologies. Their involvement includes workforce engagement, facilitating consultation across change lifecycles, and contributions to skills, training and competence frameworks. Through this role, trade unions help reinforce safety culture, ethical use and confidence in how technology is introduced and used in practice.

Academia and research networks

UKRRIN and other academic and research organisations

Academic and research organisations support the development and translation of new technologies and methods into the railway. Their role includes applied research, trials and evaluation, methods development, and independent evidence to inform adoption decisions. They also contribute to skills development and talent pipelines across the sector, embedding academic capability through arrangements such as knowledge transfer partnerships.



Freight customers depend on consistent, dependable performance to support tightly coordinated supply chains and contractual commitments. By developing a deeper, system level understanding of how the network operates, we can use automation to anticipate disruption and make informed decisions. Freight offers clear use cases, measurable outcomes, and immediate operational value, making it an ideal environment to trial and scale responsible AI solutions.”

Maggie Simpson OBE

Director General, Rail Freight Group



2. Methodology

2.1 Industry engagement

This plan has been developed through a structured engagement approach, grounded in the realities of the railway and guided by an expert AI Advisory Council. The process combines research, targeted engagement, extensive collaboration in the sector, engagement with other sectors, expert and practitioner contribution.



AI presents a significant opportunity for the rail industry to become more data driven, efficient and customer focused. The collaborative, evidence-led approach behind this AI Action Plan will provide a clear and practical foundation for unlocking that potential safely and at scale.”

Mark Robinson
Group Chief Information Officer,
DfT Operator Ltd



AI has the potential to transform the railway, but its impact is greatest when the industry works as one. Developing the AI Action Plan has created a space to share insight, align on challenges, and collaboratively shape meaningful use cases — enabling innovative, practical solutions that support a more integrated railway.”

Simon Goodman
Group Chief Information Officer,
Network Rail



Key Activities

Research and opportunity identification

Desk based research has identified existing and emerging areas where AI is already being applied, as well as areas with clear potential.

Stakeholder interviews

Interviews with a diversity of stakeholders across these areas, along with perspectives from adjacent industries, have provided insight into attitudes toward AI, barriers to adoption, lessons learned, and the conditions required for success. These discussions have informed a consolidated view of enablers, challenges and priority actions.

AI readiness assessment

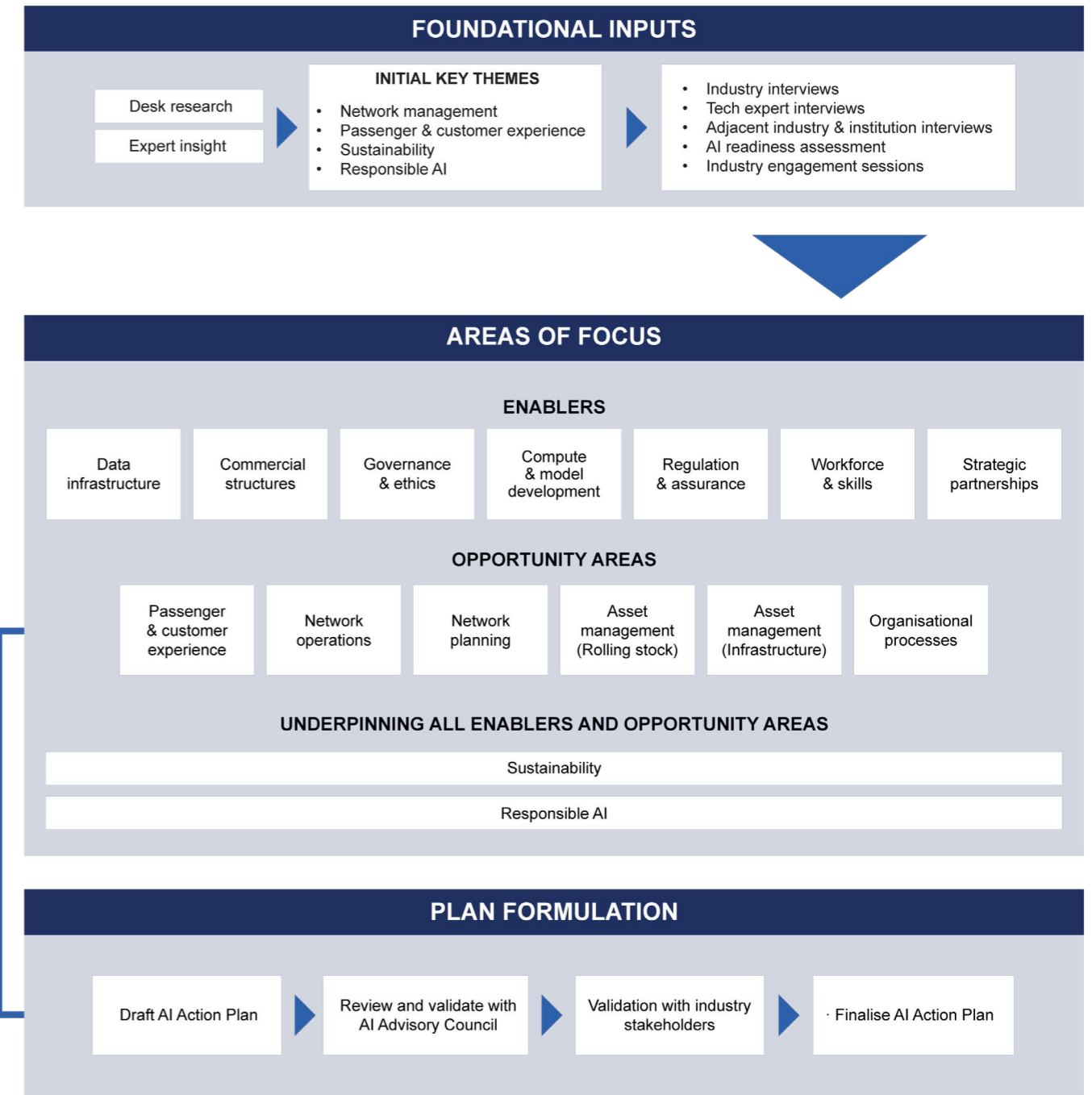
Participants in the engagement sessions completed an AI readiness assessment, providing an indicative baseline of current industry readiness for adoption and helping to identify capability gaps that need to be addressed.

Industry working sessions

Cross industry sessions have brought together sector leadership from across the opportunity areas. These sessions have been used to build a shared understanding of AI in the railway context, align on terminology, prioritise key use-case areas and validate the barriers, enablers and actions to overcome them.

Synthesis into the action plan

Findings from research, interviews, working sessions and the maturity assessment have been combined to form the evidence base for this plan, shaping priorities, enablers and actions.



There is public appetite and expectation that rail evolves. Passengers want reliability, punctuality, sufficient frequency, security, accurate information, and a seat they booked that exists.”

Laura Shoaf CBE
Non-Executive Director, DfT Operator Ltd



This plan draws on learning from organisations across the sector and beyond whose perspectives, experiences and case studies have helped shape its understanding, priorities and direction.



2.2 AI Advisory Council

The AI Advisory Council has been established to provide expert direction, guidance and challenge for the development of this plan. Formed in September 2025, the council brings together renowned experts across the fields of AI technologies, including policy, incubation, embodied applications, human centred design, safety, governance and assurance.

The Council has enabled expert scrutiny of the approach and testing of emerging priorities, enhancing robustness for railway application. The council's role can be summarised as:

- Providing expert insight into emerging AI technologies, risks and opportunities that may affect the railway.
- Challenging and reviewing progress, so that plans are aligned with the priorities and principles set out.
- Supporting alignment with wider policy and industry standards, helping assure that AI adoption remains consistent with national expectations and good practice.
- Strengthening collaboration and partnerships, connecting the railway with wider research, innovation and capability networks.
- Championing responsible and transparent AI, reinforcing the principles of safety and accountability in a safety critical environment.



The inaugural meeting of the sector's AI Advisory Council



AI Advisory Council Chair: Dr Catriona Campbell MBE has over 20 years' experience in digital transformation and behavioural psychology. She founded the technology design agency Seren, authored *AI by Design* (2022), and chairs the Scottish AI Alliance. Catriona was awarded an MBE in 2024 for services to technology and innovation.

"The plan should set building blocks, clarity and priorities without trying to centralise everything."



Professor Shannon Vallor is the Baillie Gifford Chair in the Ethics of Data and AI at the University of Edinburgh, directing the Centre for Technomoral Futures and co-leading the UKRI BRAID programme. Her research focuses on the ethical impact of AI, robotics, and data science, and she advises policymakers and industry. She is the author of two books on AI and ethics.

"People often think all AI is ChatGPT and fear it near safety critical systems, without recognising very different AI types and risks."



Helen Milner OBE, is the Founder and Chief Executive of Good Things Foundation, the UK's leading digital inclusion charity. With nearly 40 years' experience, she drives innovation in internet-based organisations and digital access. Helen chairs Subak, sits on several government advisory bodies, and is a Non-Executive Director at DSIT. She has received multiple honours, including being named the top Female Founder in UK Tech in 2025.

"Behind technology there are always people; people who design it, people who build it, and the people that use it."



Dr Laura Gilbert CBE, is Senior Director of AI at the Tony Blair Institute, leading efforts to enhance government services with AI. Formerly, she directed 10DS and i.AI at 10 Downing Street. Laura holds a doctorate from Oxford and is a Visiting Professor at LSE. She was awarded a CBE in 2023 for Services to Technology and Analysis.

"People rush to solve with AI and end up fixing the wrong problem."



Dr Seyedeh Neda Naghshbandi is Technical Director at AtkinsRéalis and a sector leader in applied AI, complex systems, and intelligent infrastructure. Her expertise lies in complex adaptive systems and agent-based modelling, refined through delivery across transportation, construction, and safety critical environments. She is a guest lecturer at UCL whose work emphasises human machine collaboration, robust safety envelopes, operational resilience and coherent system level design.

"By adopting AI, we connect data technologies and human expertise into a unified ecosystem that strengthens human-AI collaboration. Well designed agentic AI isn't solely about automation. It compensates for human limits like fatigue, whilst remaining accountable to, and governed by, humans."

2.3 AI readiness assessment

Organisational readiness for AI is dependent on several factors including leadership, data, capability, governance and operational processes. In a system as large and varied as the railway, this readiness can only be understood at the appropriate functional level.



Realising the benefits of AI in rail will depend not just on technology, but on collaboration, capability and trust. This AI Action Plan demonstrates how the industry is responding to that challenge and aligning with the direction we have set for the sector. It is a welcome and important milestone on the journey to a smarter railway and an AI enabled transport future.”

Sam Rose OBE
Director Data and Advanced Analytics, Department for Transport



High level, aggregate assessments are too broad to guide meaningful action and mask the variation that exists across the sector.

To provide an early indication, participants from across the industry have engaged in an initial assessment. This offers an indicative, quantitative view of how ready organisational functions and business units perceive themselves to be for the adoption of AI.

Emerging themes from the assessment include:

Maturity varies significantly between functions. Maintenance and operational analytics perceived as more advanced, while commercial, sustainability and workforce areas remain at earlier stages of development.

Scaling is limited. Many use cases exist, but few are fully embedded in routine operations, indicating a gap between experimentation and assured deployment

Foundations require strengthening. Data integration, skills and governance continue to be the main constraints to moving from isolated pilots to reliable, repeatable use.

Focus on system outcomes and operational value. AI will enable process efficiency, customer facing applications, and sustainability benefits.

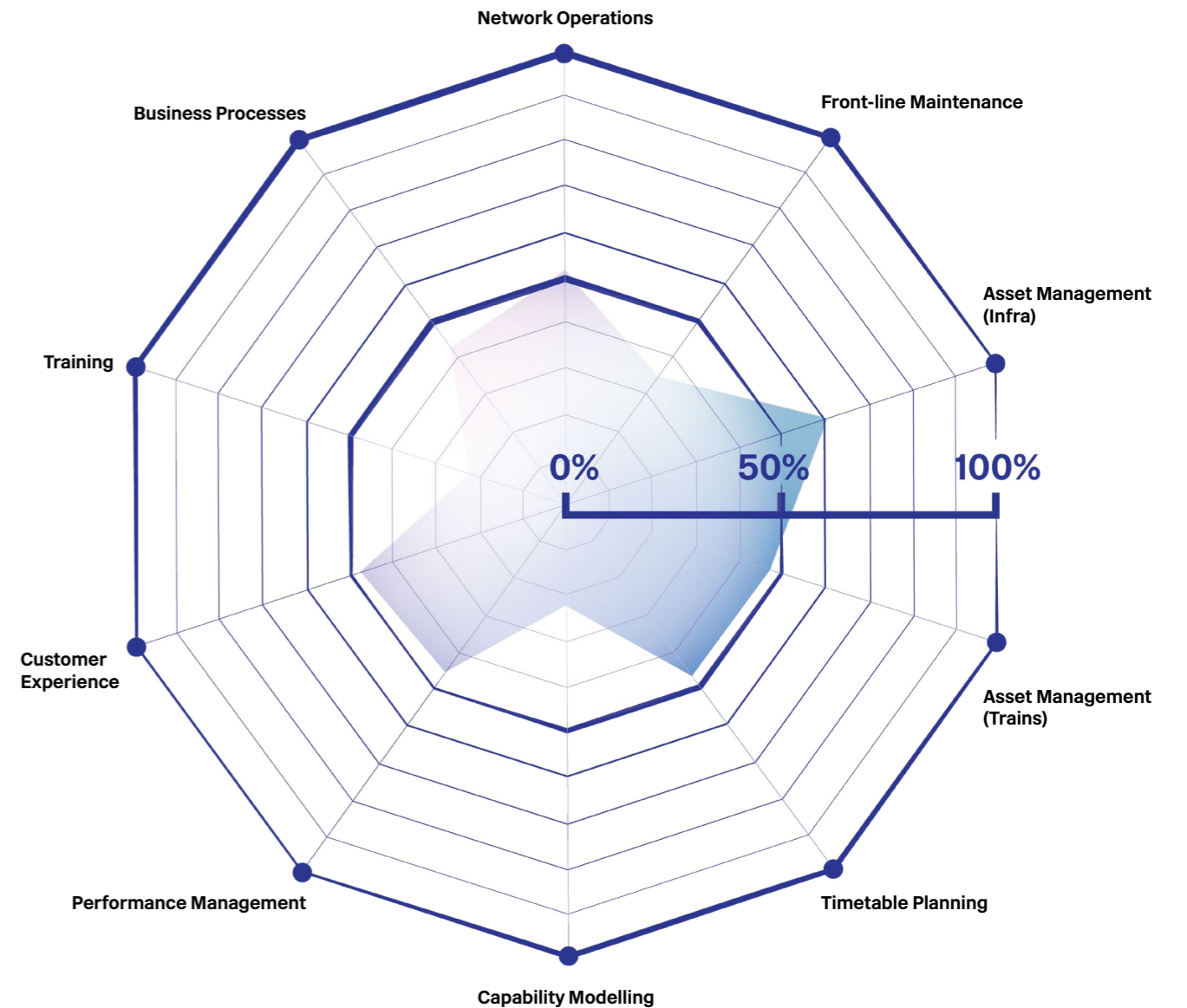
The assessment also shows that most enablers for AI adoption remain at an emerging or early stage. The strongest areas at some local levels are early formation of AI use policies, data access and quality where viable, data management where driven by standards, although maturity is uneven, disconnected and often limited to pockets where digital capability is more advanced. Leadership support and a willingness to experiment are positive, but without a strategic framework, learning and adoption remain localised or constrained by adoption barriers.

Several enablers were identified as high priority but underdeveloped. These gaps present some of the greatest constraints to sector wide adoption.

- Strategic capabilities (including partnerships)
- Governance and oversight
- Resource prioritisation (including funding)
- Commercial and procurement models

Sector AI readiness maturity assessment to understand where we are starting from

The readiness assessment highlights promising early intent and development but shows that foundational readiness varies widely across the sector. A more detailed, function level assessment is required to establish a reliable baseline across the sector to guide sequencing and measure against as capability is advanced.



1.1

Adopt a function level AI readiness assessment to establish a reliable sector baseline

This will give each organisation a clear view of its current capability and help sequence work across the sector.

3. Barriers and challenges

AI adoption is challenging in any sector. It is dependent on meaningful data, clear governance, technical robustness and a workforce that understands and trusts new tools.

These challenges sit within a safety critical, interdependent and commercially complex environment, where many organisations contribute and manage data and decisions that impact an interconnected system.

The barriers that follow reflect both the universal challenges of adopting AI and the specific constraints of the railway. Together, they explain why the sector can develop promising technical pilots that struggle to advance into repeatable, scalable capability.

3.1 Barriers encountered by all sectors

Data quality and interoperability challenges

Incomplete or inconsistent data is a major hindrance to the application of models. Some of the most impactful use cases such as predictive maintenance and degradation models depend on long-term, comparable histories of assets. When this information is fragmented or unreliable, models cannot provide trustworthy inference into asset or system behaviour.

Uncertainty in governance, ethics and assurance

Governance and assurance frameworks in most sectors are still adapting to AI. Traditional approaches assume systems behave predictably and remain unchanged once approved. AI behaves differently. Outputs are probabilistic, performance depends on data quality, and models require ongoing monitoring to detect drift or degradation.

These characteristics create uncertainty around accountability, proportionality and risk management. Where expectations for governance and lifecycle activities such as retraining or revalidation are unclear, organisations default to caution. As a result, adoption slows even where tools are technically viable.



AI is only as smart as the data and infrastructure beneath it. Without clean, connected data and scalable pipes, even the best models are just expensive guesses dressed up as insight, brittle prototypes that fall apart the moment they meet the messiness of the real world. And, without that same foundation, 'AI powered transformation' is just a slideware slogan, not a sustainable shift in how the business actually works and makes decisions."

Richard Adams
Group Head of Architecture,
DfT Operator Ltd



AI's potential can only be unleashed if it can be trusted and governed. This includes careful consideration of how it will be integrated with human judgement, empathy, and creativity, to provide ethical and sound outcomes that truly benefit rail customers and staff. At RSSB, our research programme is looking at these challenges, and we welcome the release of the AI Action Plan. By working together, we can provide a powerful mechanism to accelerate the sound and effective use of AI in rail applications."

Luisa Moisio
Director of Research, RSSB



Skills, literacy and organisational readiness

Gaps in digital literacy and uneven familiarity with AI concepts affect how confidently people interpret model outputs and integrate AI into day-to-day workflows. This is a challenge in highly technical contexts.

If people are unsure how a model works, what its limitations are or when to override its recommendations, it cannot be applied with confidence. The opposite risk also exists, where people place too much trust in outputs they cannot fully interpret. Concerns about fairness, surveillance and job impact often arise early, even before a tool is deployed.

Competing organisational priorities also constrain the ability to engage sufficiently. Operational delivery, incident management and regulatory tasks take precedence. This reduces the ability to build and sustain AI capability, limits time for training and limits capacity to embed new capabilities into established workflows.



AI adoption depends on people having the confidence to use it appropriately in their day-to-day work. That confidence comes from practical literacy about how tools behave, what their limits are and how they fit into existing roles and workflows. It also requires leaders and managers to understand the competencies involved, so they can set clear expectations, provide oversight and support safe use in operational settings.”

Neil Robertson
Chief Executive,
NSAR



Technology robustness, security and reliability risks

AI introduces risks such as adversarial attacks, data poisoning, model drift and unpredictable behaviour under rare conditions. Their implications are more significant in the railway environment where operations depend on safe, explainable and repeatable system behaviour. Any failure can affect service delivery, customer information or safety margins. Strong security controls and rigorous validation are essential. This increases the technical assurance requirements and illustrates why industries such as transportation, aviation, energy and health adopt AI cautiously even when pilots show promise.



AI will rapidly and irreversibly transform the railway, offering huge opportunities for safer, more reliable and affordable services - but only if we manage the risks. As AI introduces new cyber threats and challenges to trust, our operations must remain safe, explainable and dependable, backed by strong security and rigorous assurance. The industry must come together to plan consistently, build a workforce ready for the change, and embrace advanced AI to create a simpler, better and greener railway.”

Peter Gibbons
Chief Security Officer,
Network Rail



3.2 Rail specific barriers

Distributed system structure and incentives

As the railway is delivered through multiple organisations with distinct commercial conditions, systems and responsibilities, each hold different accountabilities and different perspectives of the system.

This distribution makes it difficult to define problems consistently, pool data or agree shared outcomes. AI opportunities often span asset, operational and customer domains, yet solutions are developed within organisational boundaries. Teams are therefore pushed towards localised development that cannot be transferred easily across track and train, public and private.



Our operational problems cut across organisational, contractual, and system boundaries. This can't be said for our data, incentives, and decision rights. That pushes teams towards local optimisation and one-off solutions, even when the underlying challenge is shared. Until we make it easier to define problems consistently, combine data across track and train, and align outcomes across organisations, AI will continue to deliver isolated wins rather than system level improvement.”

Leon Kong
Head of Integrated Data
Strategy, GBRX



Legacy systems and safety critical integration

Many operational and control systems were not designed for modern data flows or real-time analytics. Interfaces are often limited, bespoke or proprietary, contain gaps, and changes require careful testing under degraded conditions. AI tools must also integrate with long standing workflows, rules and safety cases.

This increases the environmental cost and time required to scale AI beyond a pilot to address the ecosystem interfaces. A model that performs well in isolation often needs significant redevelopment to meet the reliability, latency and behavioural expectations of operational systems.



Operational deployment of AI models in the railway environment places much higher demands on their safety, integrity, reliability, latency and behaviour under degraded conditions. The diversity of legacy systems and associated protocols can also limit the scaling up of AI adoption. Scaling AI safely requires careful and diligent integration, engineering it into the existing system, and engaging with safety and assurance processes.”

Martin Jones
Chief Engineer,
Network Rail



Complex multi party governance and regulation

Change in the railway is governed through multiple approval routes designed to protect safety, performance and neutrality. Any modification may involve obligations to other operators, compensation mechanisms, timetable implications or regulatory oversight. Deployment of AI may significantly impact existing workflows, triggering several governance pathways at once.

Cross industry deployment also requires a high degree of shared confidence in model behaviour, safeguards and operational impact.



Regulation can be a key enabler for the use of AI in the rail sector. By articulating expectations, reducing unnecessary burden, and ensuring governance frameworks evolve alongside new technologies, regulators can create the clarity and confidence required for safe, scalable adoption.”

Stephanie Todyn

Director Strategy, Policy and Reform,
Office of Rail and Road (ORR)



Market and commercial constraints

When procuring digital and AI enabled services, the sector faces practical barriers. Procurement routes can be lengthy, specialist expertise is limited, and public sector compliance requirements can discourage smaller suppliers, often favouring established or large vendors.

Access to data is also constrained across the sector and historic contractual arrangements mean that data generated in one organisation or context cannot always be reused in another. For example, a significant quantity of maintenance and condition monitoring data sits within ROSCO and OEM contracts that were not written with cross boundary AI enabled use in mind, limiting reuse and transferability across the industry. While these constraints can often be managed in the short to medium term, they highlight the need for a different approach in future commercial arrangements.

The absence of shared guardrails, model registries and development environments creates further challenges, resulting in bespoke solutions that are difficult to scale and increases supplier uncertainty. In practice, this often means data and analysis are accessed through multiple vendor specific platforms, adding complexity for users and limiting the flow of investment into reusable products.



Much of the data needed for advanced analytics and AI sits within long-term asset and maintenance contracts that never really considered reuse across organisational boundaries. Addressing this requires changes in how future commercial arrangements are structured, so we can start to unlock value safely and consistently across the system.”

Linda Wain

Engineering Director, LNER



3.3 A pilot graveyard

The interaction between general and rail specific barriers leads to a predictable and expected pattern. Small pilots are easier to generate because they rely on local data, temporary workarounds and narrow governance. They are often tailored to a single context and do not meet the requirements for adoption.

Scaling requires rebuilding solutions on common data foundations, integrating with legacy systems, aligning with safety cases, establishing monitoring processes and agreeing long-term commercial arrangements. This work is far more demanding than the technical pilot itself. Many promising pilots remain isolated, and capability is repeatedly drawn into new experiments rather than progressing existing initiatives.

The result is inevitable repeated effort and expenditure, and places sustained pressure on scarce capability. Lessons and reusable components are not carried forward or built upon and lack visibility and access across the sector.

The lack of a pathfinder approach that solves for adoption and scale pathways, means the outcome is a pattern known as pilot confetti, followed by a growing pilot graveyard where initiatives struggle to overcome adoption barriers.



We know from other sectors it is vital to consider how AI will be regulated. AI disrupts traditional approaches to accountability and responsibility, but we need to embrace that challenge. By working with regulators and across sectors, we can develop approaches to its responsible adoption and regulation.”

Professor Sarah Sharples CBE FREng

Vice President and Dean of Science and Engineering,
University of Manchester



My experience of using AI in a rail context has shown that the real value isn't in experimenting for its own sake, but in applying AI where it removes friction from complex systems – whether that's documentation, asset insight or customer experience. The Action Plan rightly focuses on moving from isolated pilots to shared, repeatable capability across the industry.”

Michael Davies

Innovation and New Product Manager
Trafnidiaeth Cymru – Gwasanaethau Trên /
Transport for Wales Rail Services



4. Human centred approach

The railway is built on the skill, experience and judgement of its people. The safe and effective use of AI depends on a workforce that understands, trusts and can use new tools with confidence.

New tools need to align with or improve established rules, working practices and the conditions in which people make decisions when responding to incidents or managing degraded operations.

AI creates opportunities to improve tasks and workflows in ways that are beneficial for people. Human centred tools can reduce manual and repetitive tasks, support or automate activities that add limited value, freeing people to apply their judgement and experience on those activities that matter most. Used appropriately, AI should make day-to-day work better, safer and less administratively burdensome.

In a sector facing long-term attrition, where experienced people are leaving faster than new entrants join, these benefits matter. They support knowledge retention, improve job quality and create conditions that attract and support new recruits.

People need clarity and appropriate training on how AI enabled tools work, how they should be used and where professional judgement remains paramount. Safeguarding principles, including human centred design and human-in-the-loop operation, support this by providing clarity for roles, responsibilities and oversight arrangements.

Early engagement with trade unions helps surface some of these questions, identify risks early and support the development of tools that are trusted, explainable and appropriate for their intended context.

Through a human centred approach, AI strengthens operational delivery, supports the workforce and contributes to a railway that remains safe, reliable and resilient as new technologies emerge.



Human factors principles for AI in rail

RSSB has set out seven human factors principles to support the safe use of AI in rail. These emphasise clear human accountability, appropriate levels of automation, explainability, effective human AI interaction, and alignment with real operational work.

2.1

Agree a proportionate approach for involving workforce representatives in AI enabled change.

Complement existing industrial relations processes, by providing clear and proportionate involvement across relevant use cases and supporting the safe introduction of tools that affect decisions, workflows or job design.



The greatest barrier to adopting AI in rail is not the technology, but organisational readiness. Investing in people and culture alongside technology will be critical to realising AI's potential safely and responsibly."

Pauline Holroyd
Group HR Director,
Network Rail



We are working closely with GBRX to ensure that the change due to AI is better understood, and standards, safety, and in particular, human factors are at the heart of enabling the AI revolution."

Vaibhav Puri OBE
Director of Sector Strategy,
RSSB



5. Foundational enablers

The following foundational enablers set out the coordinated steps needed across the sector to adopt AI. Each includes early actions to establish foundations over the first 0-12 months, to strengthen capability between 6-24 months, and to support scale over 18-36 months and beyond.

5.1 Data infrastructure

Shared data foundations are fundamental to allowing AI models to be trained, validated and used consistently across the railway. Many of these datasets are already shaped by machine learning, even when used as standard information products. As AI is applied more directly in operations, decisions rely increasingly on upstream data, models and perception layers. These dependencies need to be explicitly identified and assured so that AI supported outcomes remain reliable and aligned with operational conditions.

Connectivity is a further enabling condition. Many AI use cases rely on timely data exchange between field assets, operational systems and analytical platforms. Data infrastructure supports appropriate levels of connectivity, latency and resilience to enable responsive AI supported decision making across track and train. The intent is to create a coherent, federated railway data environment, aligned through the integrated data strategy. In summary, the actions are as follows:

Establish (0-12 months)

3.1 Engage industry in the Integrated Data Strategy's data landscape-mapping workstreams so AI priority datasets, access routes, connectivity requirements, and compute considerations are explicitly covered.

Provides a shared view of the data foundations needed for AI, and alignment with wider data landscape activity.

3.2 Feed industry AI requirements into the data architecture led by the Integrated Data Strategy and the technical architecture led by the Architecture Review Board, ensuring they support AI interoperability, lineage, access and compute needs.

AI requirements are reflected in the sector's core architectural plans rather than managed through parallel structures. It also helps create consistent data and compute foundations for AI development and use, reducing fragmentation and supporting scalable, cross industry deployment.

3.3 Engage industry in the Architecture Review Board to emerge development environments, support AI use cases and controlled modelling.

Aligns platform design with AI needs, avoiding duplicative environments so teams can develop and test models safely and consistently.

Strengthen (6-24 months)

3.4 Work with the Integrated Data Strategy workstream to shape which datasets are considered AI priority and their standards and ontologies are developed with appropriate prioritisation.

Embeds AI needs within sector wide standards activity and supports priority datasets being structured and governed in ways that support scalable AI use.

3.5 Support the Integrated Data Strategy's data quality programme by setting out the AI use cases where improved data quality and reliable upstream perception layers unlock value, helping the Integrated Data Strategy prioritise and sequence effort.

Data quality improvements focus on areas that enable AI delivery. Helps direct monitoring, automated cleansing and validation pipelines to domains where better data quality has the greatest impact on AI performance and downstream decision reliability.

3.6 Feed industry AI requirements into the Integrated Data Strategy workstream so that standardised APIs and controlled access mechanisms for curated, model-ready datasets are designed to support AI model consumption.

Data interfaces and access routes are designed in ways that enable AI development and use, while remaining consistent with wider data standards and access control work across the sector.

3.7 Coordinate AI specific security requirements with the Architecture Review Board and Cybersecurity Boards, ensuring AI specific risks, such as data integrity and model manipulation, are addressed.

Integrates AI related risks into existing security frameworks, avoiding parallel controls and supports safe development and use of AI across the sector.

Scale (18-36 months)

3.8 Coordinate industry input into the Integrated Data Strategy's federated data access workstream so the emerging framework supports cross organisational AI use cases as a first class requirement.

This will help create a secure, consistent way for organisations to access and reuse data needed for AI while avoiding parallel access frameworks.

3.9 Incorporate AI data dependency requirements into the long-term data architecture roadmap led by the Integrated Data Strategy, linking foundational data work with key AI pathfinders.

AI ready data flows will be embedded into future systems and ensure architectural decisions support scalable AI use across track and train, including the management of critical upstream dependencies.

3.10 Make sure AI data dependency requirements are incorporated into the long-term data architecture roadmap led by the Integrated Data Strategy, linking foundational data work with key AI pathfinders.

This will embed AI-ready data flows into future systems and ensure architectural decisions support scalable AI use across track and train, including the management of critical upstream dependencies.

3.11 Maintain a standing interface with the Integrated Data Strategy workstream so ongoing ontology, standards and metadata maintenance reflect AI's evolving requirements.

This will help sustain interoperability as AI capability grows and mean changes to shared definitions and standards continue to support AI development and use.

3.12 Establish process for industry to notify the Integrated Data Strategy and the Architecture Review Board of upcoming digital and asset programmes with significant AI potential, so foundational data integration needs can be identified early and reflected in programme design and procurement.

This will help future digital and asset programmes build in AI data requirements from the outset, reducing rework and supporting scalable AI deployment across track and train.

3.13 Establish AI interoperability standards focused on reuse, validation and safe deployment of models through shared data and interface foundations.

This will help organisations build on shared approaches, reduce duplicated development effort and support consistent assurance of AI solutions across the sector.

5.2 Commercial structures

AI adoption depends on contracting models that support iterative development, shared data usage, model transparency and long-term maintainability. Today's commercial frameworks often impede this, creating lock ins, duplicated procurement and inconsistent IP arrangements.

Establish (0-12 months)

4.1 Map supplier provided AI capability and the railway's contractual access rights.

Reveals gaps in access to data, features, training sets, explainability artefacts and IP, helping identify restrictions that limit monitoring, assurance, reuse and long-term maintainability.

4.2 Define cross industry commercial expectations for procuring AI enabled tools.

Sets consistent expectations on data sharing, model visibility, monitoring obligations and IP treatment. This includes permitted supplier use of railway data for model training and any restrictions on onward reuse. It will align them with procurement practice, the Integrated Data Strategy and AI governance.

4.3 Translate the agreed AI commercial expectations into contract clauses and update procurement templates.

Creates enforceable, consistent requirements covering data access, permitted supplier uses of railway data, data exchange protocols, data quality expectations, model-monitoring obligations and IP licensing, reducing bespoke negotiation.

4.4 Define a market segmentation approach for selecting appropriate procurement routes for AI.

Guides when to use competitive processes and when strategic partnerships or specialist routes are more suitable. It helps avoid fragmented competition in immature markets and supports coherent, long-term capability development.

4.5 Define procurement principles for how and when AI related requirements should be applied.

Gives procurement teams a clear basis for preparing AI tenders and evaluating proposals, including principles on proportional competition, avoiding supplier lock in, enabling switching where better solutions emerge, and supporting long-term flexibility in a rapidly changing market.

Strengthen (6-24 months)

4.6 Develop standard contract clauses that reflect the agreed commercial expectations for AI and introduce a mechanism to track how these clauses perform in practice.

Provides consistent contractual wording for data access, model transparency, performance reporting, monitoring and IP/licensing, reducing bespoke negotiation and giving evidence on which terms deliver the strongest outcomes.

4.7 Embed the standard AI contract clauses into procurement practice, incorporating them into major procurement routes, frameworks and templated commercial documents.

Supports consistent application of the agreed clauses, reduces bespoke negotiation and increases predictability for suppliers.

4.8 Introduce a process to identify and prevent duplication where organisations pursue similar AI solutions or approach the same suppliers independently.

Reduces duplicated effort and strengthens the railway's bargaining position with suppliers.

4.9 Communicate the agreed AI commercial requirements across the sector to support consistent understanding and application.

Helps organisations apply requirements appropriately and reduces the risk of inconsistent or unsuitable arrangements being agreed.

Scale (18-36 months)

4.10 Adopt commercial models that incentivise reusable components, shared insights and long-term model maintenance.

Helps investment compound across the sector, supports continuity when suppliers change and reduces fragmentation over time.



AI is the defining technology of our generation – transformative on a scale comparable to, and likely faster than, the Industrial Revolution. Done right, it will be Britain's productivity engine, and the railway industry has an opportunity to lead from the front. We will succeed by targeting the right opportunities, redesigning processes with AI at the core rather than as an add-on, and driving disciplined adoption end-to-end.”

Clive Berrington
Group Director, Route Services,
Network Rail



5.3 Governance and ethics

Governance and ethics guide whether and how AI should be used by setting expectations and boundaries. The railway context requires governance that is clear, risk based and aligned with existing safety and assurance expectations.

Current frameworks are designed for deterministic systems – those that behave predictably and remain stable once approved. They do not yet reflect AI characteristics such as probabilistic outputs, dependence on data quality and the need for ongoing monitoring. A consistent and proportionate approach is therefore important to support safe and responsible use.

For example, in some predictive and decision support applications, AI can be introduced where evidence shows performance exceeds real world human baselines and they are supported by commensurate guardrails.

Ethical considerations such as transparency, fairness and accountability sit within this governance and shape how AI should be designed and applied.

Cybersecurity is embedded across data, compute, governance and assurance rather than managed as a standalone activity.

RSSB will play an important role in this area. Its safety assurance functions and current work on AI assurance guidance provide foundations that this will be built on and aligned with. Clear, shared governance will help organisations understand what is required, reduce uncertainty and support confident progression from pilots into assured operational use.



We should be thoughtful about where AI can add value, clear about its limitations, and remain committed to strong governance, security, and assurance. AI can support our people, strengthen decision-making, and help the industry respond more effectively to operational demands and longer-term change.”

Alan Cain
Chief Information Security Officer, Rail Delivery Group



Establish (0-12 months)

5.1 Define the scope and purpose of AI governance and ethics for the railway, including risk tiers, boundaries for use and links to existing safety and privacy obligations.

Aligns future governance with existing safety and assurance responsibilities, avoids duplication of ongoing work and supports proportionate decision making across the sector.

5.2 Create a short-term design group to review existing governance and assurance frameworks and recommend a long-term structure for AI governance.

Future governance is credible, proportionate and aligned with existing safety and assurance responsibilities across the sector.

5.3 Identify the AI governance and ethics frameworks that apply to the railway and determine which should be adopted.

Establishes the baseline requirements, regulatory, industry and voluntary, and informs the design of a consistent governance approach.

5.4 Produce an initial risk based policy for AI, covering acceptable use, human oversight, data safeguards and model-behaviour boundaries.

Gives organisations clear early guidance on permitted use and supports consistent, proportionate decision making while long-term governance is developed.



AI can radically improve decision support, but it only creates real value when accountabilities are clear and governance is strong enough to match the complexity of the network. It will provide us with a powerful tool to make better, faster, and more joined-up decisions across rail. Without that, AI doesn't fix the system, it simply amplifies its weaknesses”

Robert Ampomah
Chief Technology Officer, Network Rail



Strengthen (6-24 months)

5.5 Establish the long-term AI governance structure, based on the short-term design group's recommendations, with clear remit and reporting routes into existing assurance pathways.

Provides sustained oversight as AI adoption expands, and governance remains aligned with the sector's established safety and assurance processes.

5.6 Define the policy and processes for AI lifecycle assurance, including oversight of the procurement process, retraining, revalidation, monitoring and drift management.

Supports safe, consistent model evolution and helps organisations manage AI systems over time, in line with established assurance expectations. It will include the implementation of an incident reporting facility, designed for reporting safety and ethical concerns.

Scale (18–36 months)

5.7 Embed AI governance expectations into investment, change and programme management processes across the sector.

Helps governance requirements be considered early in programme design and sustained as AI adoption grows.

5.4 Regulation and assurance

Regulation and assurance determine whether AI can be deployed safely and consistently in operations, complementing the governance and ethics that guide whether AI should be pursued and the principles it must follow. This is key to building confidence in the safety and reliability of AI.

Existing processes need to incorporate AI specific characteristics such as drift, retraining, uncertainty and probabilistic outputs. There is a risk that initiatives involving AI are treated as high risk by default. A proportionate approach is therefore important, so that low risk decision support tools are not subject to the same regulatory and assurance pathways as safety critical applications.

Embedding AI into rail's assurance and regulatory frameworks, including the work led by RSSB, will reduce uncertainty and support safe adoption.

Establish (0-12 months)

6.1 Identify where AI related risks should be integrated into existing safety and performance assurance processes and risk registers, including risks of not adopting AI where it could improve safety or performance.

Helps AI risks to be managed proportionately through established frameworks rather than through parallel structures.

6.2 Identify the regulations that apply to AI use in rail and clarify the associated compliance requirements.

Provides organisations with a clear understanding of their regulatory obligations when developing or deploying AI systems.

6.3 Work with relevant bodies to begin incorporating AI assurance into existing assurance processes and prepare initial updates to guidance reflecting proportionate AI requirements.

Begins the process of aligning approval routes with the characteristics of AI systems and provides early direction for assurance functions.



Strengthen (6-24 months)

- 6.4** Agree with relevant bodies how AI will be examined under existing regulatory expectations, finalise any modifications to approval processes, and publish updated guidance for assurance functions.

Gives clarity on how AI systems will be assessed, reduces uncertainty around approval routes and supports safe, timely adoption.

- 6.5** Develop a consistent process for AI assurance covering validation, monitoring, retraining, drift management and fallback arrangements.

This will give organisations a clear and proportionate pathway for seeking approval for AI systems and managing them throughout their lifecycle.

- 6.6** Develop a plan for integrating existing AI deployments into emerging governance and assurance frameworks, including assessment against new expectations and identification of appropriate transition pathways.

Supports consistent governance for existing systems while avoiding unnecessary disruption to operations.

- 6.7** Provide training and awareness for governance forums and assurance functions on AI risks and required controls.

Builds capability to assess and manage AI in line with emerging governance and assurance expectations.

Scale (18-36 months)

- 6.8** Embed AI assurance expectations into sector safety frameworks and cross industry governance routes.

AI assurance becomes part of standard practice, rather than an exception, as deployment grows.

- 6.9** Maintain ongoing engagement with regulatory bodies and update regulatory and assurance expectations as technology evolves and evidence from operational deployment accumulates.

Keeps regulation and assurance proportionate, evidence based and supportive of safe, beneficial adoption.

5.5 Workforce and skills

AI adoption depends on a capable workforce that understands how tools work and how to use them responsibly. This includes creating the conditions for people to raise safety and ethical concerns with confidence, which is an important safeguard as AI enabled tools are introduced.

Skills vary across the sector, and there is no consistent view of what different roles need to know. In some cases, repeated exposure to digital tools that do not meaningfully improve day-to-day work has led to fatigue and reduced engagement.

As AI becomes more embedded in operational processes, some roles will increasingly involve overseeing and coordinating AI supported workflows, understanding their limits and intervening where necessary. Strengthening workforce capability in a way that is practical and relevant is therefore essential to build trust, support safe adoption and improve job quality.

Establish (0-12 months)

- 7.1** Map potential sources of AI talent, including existing sector capability, graduate and apprenticeship pipelines, mid-career talent from adjacent industries and external specialist recruitment.

Informs recruitment and capability development strategies and identifies the most accessible talent pools for rail.

- 7.2** Initiate and operationalise the Data & AI apprenticeship programme sector wide.

Embeds applied AI and data-science skills directly into rail through structured pathways, helping employers access skilled apprentices and building confidence in AI adoption across the sector.

- 7.3** Identify which roles require which levels of AI awareness, literacy or technical competence based on job responsibilities.

Training is targeted and tailored to operational need.

- 7.4** Baseline current AI related skill levels across the sector and identify critical gaps.

Helps prioritise where capability development is most needed.

- 7.5** Determine the training mechanisms and expertise needed to close identified gaps. These include general AI awareness, specialist talent capability and ethical considerations for AI.

Supports safe and confident use of AI in practice by matching training methods to workforce need.

- 7.6** Create a central hub for AI related learning resources and workforce development guidance.

Provides accessible training materials and supports consistent capability development across the sector.



Strengthen (6-24 months)

7.7 Establish and scale delivery of the Data & AI skills programme across the sector.

Delivers structured pathways for developing AI capability at scale as the programme matures.

7.8 Expand training provision into specialist areas such as data engineering, model validation and AI assurance.

Builds deeper technical capability where it is most needed. It should be developed in parallel with governance and ethics capability to avoid creating new risks as AI systems become more advanced.

Scale (18-36 months)

7.9 Embed AI related competence into workforce development pathways and professional standards, including graduate, apprenticeship and mid-career routes.

Sustains capability as adoption increases and there is a continuous supply of skilled people.

5.6 Strategic partnerships

In order to build sector capability, the industry requires access to leading expertise from across academia, technology companies, industry bodies and innovation centres. This requires a purposeful and structured approach.



AI's real value will only come when it is embedded in processes, culture and governance, and combined with human judgement to solve customer problems, not treated as a standalone tool. We're working with GBR, GBRX and partners, through collaboration across the whole system, to help unlock and accelerate these benefits."

Shamit Gaiger OBE
Managing Director, West Coast Partnership Development



Establish (0-12 months)

8.1 Map existing AI related partnerships across the sector, including academia, SMEs, technology firms, industry bodies and innovation centres, and assess their scope, value and any areas of duplication or gaps.

Provides a clear view of current partnership activity and shows where additional capability or coordination is needed.

8.2 Define clear criteria for selecting high value partners, setting out required capability, evidence of delivery, alignment with rail priorities, and willingness to collaborate on development.

Supports consistent, transparent partnership decisions and helps focus engagement on organisations that can provide measurable value.

8.3 Develop a flexible onboarding approach for strategic partners, with clear steps for engaging established organisations and SMEs, and proportionate requirements for capability, due diligence and data access.

Reduces barriers to engagement, particularly for smaller specialist providers, and supports consistent entry routes into partnership.

Strengthen (6-24 months)

8.4 Formalise priority partnerships and agree joint initiatives in areas such as research, standards development, safety, and capability building.

Gives key relationships structure, clarifies shared objectives and partnerships, delivering mutual value.

8.5 Deliver joint initiatives through priority partnerships and introduce simple metrics to track partnership outcomes and realised value.

Evidences what partnerships deliver in practice and supports consistent, informed decisions about future collaboration.

8.6 Establish a simple mechanism to monitor national and international developments in rail AI and broader AI advances and filter relevant insights into sector adoption.

Helps the sector remain aware of emerging approaches, allowing it to adjust activity where evidence from other contexts shows clear benefit.

8.7 Develop a programme to strengthen the UK supplier ecosystem for AI in rail, using mechanisms such as supplier-engagement events, access to development environments and data, innovation challenges and targeted capability development in areas where market supply is limited.

Broadens the pool of credible suppliers and supports development of UK based AI capability relevant to rail needs.

8.8 Establish a simple mechanism to avoid overlap between partnerships, provide consistent coordination and reduce conflicting commitments.

Helps prevent duplication and supports a coherent approach to working with external partners.

Scale (18-36 months)

8.9 Establish multi year strategic partnerships in high value domains such as simulation, asset modelling and next generation optimisation.

Provides continuity and sustained access to specialist capability as AI adoption expands.

5.7 Compute and model development

AI development requires compute capacity, tools and shared development environments. To build on existing cloud and high performance compute capability, there is a need for a more coordinated approach that reduces duplication and supports repeatable development across the industry.

This includes access to physical testbeds within the operational network, which are critical for validating and scaling AI solutions in real world conditions prior to wider deployment. It also includes edge and distributed computing capability, which is required to support field based AI use cases and timely decision making where low latency or local processing is necessary.

Establish (0-12 months)

9.1 **Baseline existing compute capacity, development tooling and model development environments across the sector.**

Shows current capability and reduces unnecessary duplication of infrastructure investment.

9.2 **Estimate future compute requirements for priority AI use cases, based on expected model complexity, data volumes and operational usage.**

Supports proportionate infrastructure planning and helps target investment where it delivers the most value.

9.3 **Provide initial shared, compute backed development environments aligned with the Data Infrastructure enabler, giving teams a consistent place to build and test AI models.**

Provides a platform for safe experimentation, reduces barriers to starting development and avoids fragmented local environments.

Strengthen (6-24 months)

9.4 **Develop a plan to meet future compute requirements, assessing cloud, on premises and hybrid options and setting out proportionate routes for scaling capacity.**

The sector has adequate and cost effective compute capacity as AI adoption grows.

9.5 **Assess the need for high performance computing capability to support complex simulations, large-scale optimisation and advanced model training.**

Highlights where specialist compute is required beyond standard cloud environments and informs balanced investment decisions.

9.6 **Introduce simple monitoring of compute usage and costs to improve resource allocation and inform future investment decisions.**

Provides visibility of where compute is being used and helps efficient capacity allocation.

9.7 **Enable suppliers and SMEs to access shared, compute backed development environments, aligned with the Data Infrastructure enabler and proportionate security expectations.**

Reduces barriers to entry and broadens the pool of organisations able to contribute to AI development in rail.

Scale (18-36 months)

9.8 **Plan and implement expanded compute capability to support long-term AI demand, considering emerging technologies such as quantum computing where relevant.**

Helps the sector meet future computational needs and takes advantage of technological advances as they mature.

6. Implementing this plan

6.1 Purpose

Delivering this Action Plan depends on organisations across the sector working in a coordinated way. AI enabled activity cuts across multiple organisational boundaries, and progress relies on strategic clarity, purposeful action, overcoming adoption barriers and delivery models that reflect how the railway operates in practice. The Artificial Intelligence Incubator Accelerator (AIIA) has been established to orchestrate delivery in a federated model and to provide strategic alignment where system level dependencies exist.

6.2 Pathfinder approach

Why a structured approach is needed

AI opportunities span customer experience, network operations, planning, asset management and internal functions, creating common data and process dependencies across organisations. When these dependencies are not addressed, activity fragments into local pilots that perform well in isolation but cannot scale.

A structured approach is necessary so that early solutions are developed with required conditions for safe use and adoption. AI cannot compensate for broken, analogue or inconsistent business processes. Pathfinder activity needs to surface and address underlying process, data and operating model constraints, rather than working around them.

Dependencies that reinforce one another

The enablers for AI adoption depend on each other in predictable ways. Governance shapes commercial models; commercial arrangements dictate data availability; data quality influences compute requirements; and compute capacity constrains deployment. Progress in one area strengthens conditions in others. Recognising these reinforcing relationships allows work to be sequenced deliberately to create viable pathways.

What is a pathfinder

A pathfinder is the primary mechanism for developing AI enabled capability in a real operational context. This includes data foundations, processes, system interactions, governance arrangements and workforce roles. By working through these elements in a methodology, they surface the constraints that limit scale and clarify what needs to be true for solutions to be applied with confidence.

Pathfinders are designed to produce reusable components, including data patterns, workflow designs, assurance artefacts and delivery methods. These can be applied beyond the initial setting and combined with learning and capability from other pathfinders.

Why pathfinders differ from pilots

Pathfinders differ from traditional pilots in intent and discipline. Pilots typically test whether a solution can function technically and in a limited context. Pathfinders are concerned with the barriers to adoption and scale.

They include decision points that allow work to progress where evidence supports value, and to stop where assumptions cannot be met or scaling would not be viable. This limits resource exposure and reduces the accumulation of disconnected activity.

As pathfinders progress, the components and evidence they generate reduce friction for subsequent work. Improvements established in one setting strengthen conditions elsewhere, enabling a deliberate build out and build across of capability over time. This creates a compounding benefit and progressive pathways for adoption.

6.3 A shared North Star

Pathfinders are selected and sequenced against a shared North Star describing how AI strengthens reliability, customer experience, safety, efficiency and resilience. This helps early activity contribute to system level outcomes, focus resources on valuable problems and support capability growth over time.

Pathfinders fall into two categories:

Incubator pathfinders

Proving and de-risking emerging capability.

Accelerator pathfinders

Scaling proven capability where conditions are sufficiently mature.

This distinction supports prioritisation and sequencing, allowing exploration and scale to progress at different paces.

6.4 Connecting pathways

The opportunity areas describe where AI can add value. The enablers set the conditions for safe and consistent delivery. Pathfinders sit between these by applying the enablers to real operational challenges and generating the learning, evidence and reusable components required for adoption.

To avoid duplication and repeated reinvention, some actions are coordinated once and applied across all opportunity areas:

- Building a shared understanding of current AI activity.
- Defining the foundations required in each domain.
- Setting repeatable routes from design into use.
- Embedding reuse of data patterns, workflows and validated artefacts.

These shared foundations shape how opportunity areas are developed and applied in practice.

6.5 Immediate action (0-12 months)

Early activity focus on establishing delivery structures and capabilities, coordination and enabling pathfinders.

Establishing delivery capability

10.1 Establish and operationalise the Artificial Intelligence Incubator Accelerator (AIIA) based on best practice learning.

Provides a sector wide delivery model for coordinated AI development, avoiding duplication and supporting consistent delivery across organisations.

10.2 Establish cross industry participation and delivery roles.

The right operational, engineering, data and commercial expertise is consistently available to shape early discovery, data access and design.

10.3 Create a single view of current and past AI initiatives, organised by opportunity area.

Provides a reliable baseline, reduces repeated effort and directs attention to the activity with the greatest potential to scale.

10.4 Ensure early pathfinders have a minimum viable data pathway, a safe development environment and the core skills required for discovery and design.

Enables the essential conditions needed to progress early work and reduces avoidable delay.

Establishing shared direction

11.1 Set a shared North Star describing long-term AI outcomes across reliability, customer experience, safety, efficiency and resilience.

Aligns decisions across organisations and guides pathfinder selection toward system level outcomes.

11.2 Define criteria for selecting pathfinders, including clarity of problem, feasibility, access to operational settings, potential for reusable learning and alignment with adoption conditions.

Focuses early activity on challenges with a credible route to implementation.

Shaping delivery around operational reality pathways

12.1 Define a consistent process for involving front line teams in discovery, development and implementation.

Solutions reflect operational conditions and support confident and safe use.

12.2 Advance Horizon 1 (Adopt) opportunities that can demonstrate value within months and accelerate their delivery.

Builds confidence, generates early evidence and creates momentum for wider adoption.

Creating predictable delivery pathways

13.1 Establish clear decision routes for AI enabled work and simplify overlapping forums and assurance paths.

Reduces ambiguity, shortens approval cycles and creates predictable routes for delivery teams.

13.2 Define how AI integrates into existing business and governance processes rather than creating parallel structures.

Lessens implementation friction and supports practical adoption.

13.3 Agree key industry leaders as executive co-sponsors for actions and propositions.

Provides senior ownership and help resolve issues that cut across organisations.

Strengthening communication and engagement

14.1 Define the sector's approach to transparent communication about AI, including how use is explained to passengers and staff.

Supports trust and provides consistent information across the sector.

14.2 Organise the sector's approach to AI thought leadership, supported by a shared calendar of events.

Develops a coherent voice and supports recruitment, partnerships and knowledge exchange.

6.6 Expanding delivery (6-24 months)

As early work progresses, the focus shifts to extending delivery, maturing structures and embedding reuse.

Extending and sequencing delivery

15.1 Prioritise and advance Horizon 2 Adapt and Horizon 3 Invent opportunities in each opportunity area.

Guides medium and long-term development and clarifies where solutions require adaptation or invention.

15.2 Create a multi year roadmap covering activity across all three horizons.

Gives a clear line of sight for planning investment, resourcing and capability development.

Maturing governance and delivery structures

16.1 Align existing forums with the future state model and clarify their roles in supporting AI work.

Provides predictable governance pathways and proportionate scrutiny.

16.2 Establish clear, end-to-end delivery pathways in each opportunity area covering discovery, design, testing, assurance and operational use.

Delivers repeatable, scalable routes for safe implementation and reduces ambiguity for delivery teams.

16.3 Begin integrating AI coordination into emerging GBR reform structures.

Avoids duplicated arrangements, maintains continuity and supports a smooth transition as responsibilities evolve.

Expanding reuse and shared learning

17.1 Introduce a standard approach to capturing reusable code, data patterns, validation artefacts, workflow designs and lessons learned from each pathfinder.

Reduces repeated reinvention and helps organisations apply proven approaches.

17.2 Create a shared AI Solutions Library and delivery playbook covering reusable components and assurance expectations.

Supports predictable, efficient adoption and allows successful methods to compound across organisations.

6.7 Scaling and sustaining (18-36 months)

As capability matures and concepts have moved through the evaluation process the priority shifts to sustaining coordination and embedding AI into normal practice.

Sustaining coordination

18.1 **Transition to a sustained model of AI coordination where cross industry structures operate predictably.**

Supports long-term stability and helps organisations plan future investment and adoption.

18.2 **Refresh the AI Council's Terms of Reference to clarify its role in providing challenge, technical input and cross industry alignment.**

Oversight remains effective as roles and structures change.

Maintaining shared foundations

19.1 **Maintain and evolve the AI Solutions Library and delivery playbook as solutions and assurance expectations develop.**

Keeps shared guidance current and supports consistent adoption as capability matures.

19.2 **Maintain a live cross industry record of reusable components, patterns and lessons linked to the solutions library.**

Shortens time-to-value for later adopters and reduces duplication.

6.8 Roadmap and prioritisation

A coherent approach to roadmap and prioritisation helps local activity support industry outcomes so that opportunity areas develop in a coordinated way, enabling adoption and scale.

As part of this approach, the first question for any initiative will be whether AI is required. This avoids unnecessary experimentation and keeps attention on work that can improve operational, customer or asset outcomes.

20.1 **Maintain a single network level AI strategy and roadmap that set shared priorities and guide investment across organisations.**

Aligns organisational plans, reduces fragmentation and supports coherent long-term adoption.

20.2 **Apply the agreed prioritisation framework when selecting and sequencing AI initiatives.**

Decisions are consistent and effort focuses on areas where AI is appropriate and practical to adopt.

6.9 Funding and investment

AI enabled work needs predictable funding to progress from experimentation to adoption. Current activity often relies on short-term innovation budgets without clear routes into operational funding. This creates a pattern where solutions prove valuable but struggle to move into business as usual.

A coordinated funding approach will support progression to operational use and allow organisations to plan with confidence. Where capability is intended to be shared or reused, this requires funding to be considered and allocated collectively rather than through multiple parallel initiatives.

21.1 **Develop a Funding Period 1 aligned strategy for shared AI capability, setting out how pathfinders progress into adoption, how ongoing costs will be met and how business cases show who will fund and adopt maturing capability.**

Supports predictable investment, reduces duplication and helps bridge the gap between experimentation and business as usual.

21.2 **Establish a consolidated funding route for shared AI capability, through which investment in pathfinders and common components is commissioned and allocated once on behalf of the system.**

This will reduce parallel development, improve reuse of capability and ensure investment decisions are made in the context of whole system priorities rather than individual organisational need.

6.10 Governance and assurance

As this plan is implemented, delivery teams need clear and consistent expectations on when local assurance is sufficient and when cross industry alignment is required. Without this, assurance activity can either slow progress unnecessarily or leave gaps in oversight.

Effective delivery will depend on applying assurance that is risk based. This includes distinguishing between low risk decision support tools and safety critical applications and avoiding a default assumption that all AI enabled initiatives require the same level of scrutiny. Clear safety boundaries, monitoring arrangements and decision thresholds will support timely progression through design, test and use.

22.1 **Establish proportionate governance and assurance expectations for AI enabled work, defining when local approval is sufficient and when sector level alignment is required.**

Gives delivery teams clear guardrails, supports predictable approval cycles and focuses oversight where risk is highest.

6.11 Developing capability

AI adoption depends on people across all domains who can apply the capability in operational contexts, interpret outputs and integrate tools into workflows. Today, capability is often distributed in small, disconnected teams, creating bottlenecks and limiting the pace of adoption.

A structured capability pathway will help spread these skills, build confidence and support the federated model described in this plan.

23.1 **Implement a sector wide capability programme using pathfinders, secondments, supplier collaboration and early-career routes to build practical delivery skills.**

Strengthens distributed capability, reduces dependency on central teams and helps embed activity within existing programmes linked to operational and financial outcomes.

6.12 Monitoring progress and feedback loops

Delivery needs to be visible and adaptable. Project-level metrics remain important but do not show whether the sector is implementing this plan effectively or whether enablers are maturing as expected. A small set of shared indicators, combined with learning from pathfinders and AIIA, will create a feedback loop that supports adjustment over time.

24.1 **Agree and implement a small KPI framework to track delivery of this plan, combining indicators with learning from pathfinders and AIIA.**

Supports transparent progress monitoring and allows for timely adjustments as delivery evolves.

6.13 Delivery risks

Alongside the known barriers and challenges, there are risks specific to implementing this plan:

→ Activity continues in silos and does not reflect shared priorities

→ Funding remains misaligned with adoption

→ Assurance slows progress more than necessary

→ Capability remains distributed rather than coordinated

→ Operational and reform pressures reduce capacity to engage

These risks will be mitigated through the delivery model including governance of an executive sponsoring group creating shared monitoring and continuous learning.

25.1 **Establish the AIIA executive sponsoring group.**

The group will provide senior ownership of AI priorities for the sector, with oversight of activity, resources and funding decisions. It challenges where needed and helps resolve issues that cut across boundaries.

25.2 **Maintain a live cross industry delivery risk and learning register, capturing issues, mitigations and insights.**

Supports early identification of risks, enables proportionate mitigation and learning informs future prioritisation and capability development.

7. AIIA

The industry's AI Incubator Accelerator

To progress adoption of AI, GBRX has established the industry's AI Incubator Accelerator (AIIA), led by Dr Sarah Schlobohm. Sarah brings the scientific, regulatory and strategic expertise required to establish this function from the outset.

A single point of orchestration for federated activity

AIIA provides the expert orchestration across the sector, applying the principles demonstrated by the DSIT AI Incubator. This gives the industry an orchestration point for assessing problems, shaping solutions and embedding learning across the system. The accelerator element takes locally proven solutions into operational use by creating adoption pathways for them to scale.

AIIA uses a sector engagement model that provides a selection of methods for working with industry whilst allowing organisations to lead where they have capability, creating coherence in a federated model.

A co-sponsored and multidisciplinary way of delivering solutions

AIIA follows a problem-first approach grounded in real operational environments. Prioritisation focuses on the ability to demonstrate benefit in practice, while creating components that can be reused beyond the initial setting. This keeps AI application focused on practical value and scalable adoption.

Delivery is co-sponsored and co-executed in a federated model, with organisations leading adoption in their areas of responsibility.

An accelerator that builds enduring capability

AIIA is designed as an accelerator that builds the foundations needed for sustained adoption of AI. It develops people through active delivery, establishes shared approaches and creates reusable assets. Over time, ownership is expected to transfer into standard business practice across the wider industry.

Connecting capability to practical application

Talent for AIIA is drawn from a mixture of internal experts, secondees from operators and Network Rail, specialists from suppliers, and early-career talent from programmes such as Data and AI apprenticeships. This strengthens capability across the sector and develops a pipeline of future leaders who understand both AI and rail operations.

AIIA enables the sector to test what works, refine what is needed and make meaningful progress with confidence, as AI is applied across the railway in a structured and coherent way.

7.1 How AIIA engages

AI activity across the railway varies in maturity, scale and ambition. Initiatives range from early exploration to active delivery. AIIA uses different engagement models according to complexity, system impact and strategic alignment of the activity being undertaken.

This makes sure that effort is focused where it can deliver the greatest benefit. It balances coordination with local leadership, allowing organisations to lead where they have capability, while providing orchestration.



Across the sector we're already seeing pockets of excellence in how AI is supporting operations, engineering and customer experience. AIIA exists to accelerate that progress by helping teams move through pilot, production and operational use. We share guidance on what works, and build the capabilities the industry needs to deploy AI at scale."

Dr Sarah Schlobohm
Director of AIIA, GBRX



What this involves	When this model is used	Illustrative outputs
AIIA led delivery		
AIIA working with partners to develop and transition solutions into operational use.	Strong alignment to the North Star; cross industry impact; coordination across multiple organisations or technical boundaries; unclear or contested ownership; high consequence if delayed or unsuccessful.	Orchestrated delivery plan; agreed ownership and assurance route; reusable components and evidence to support adoption beyond the initial setting.
Field led delivery supported by AIIA		
Delivery is led by an organisation, with AIIA providing targeted technical expertise, co-design input, additional resource or access to shared methods.	Local application; potential to scale or transfer; opportunity to generate reusable capability; delivery constrained by capability, capacity or assurance maturity.	Accelerated delivery; strengthened assurance evidence; improved transferability; reusable artefacts and patterns where appropriate.
Guidance and assurance support		
AIIA provides advisory input to help teams shape approaches, navigate governance and assurance expectations, and draw on learning from elsewhere in the sector.	Owned and resourced initiatives; limited system impact; need for alignment, consistency or early assurance input rather than delivery support.	Clearer approach and decision route; alignment with standards and lessons learned; reduced rework and assurance uncertainty.
Inspiration and capability building		
AIIA shares learning, highlights effective practice and supports skills development to improve the quality and confidence of AI activity across the sector.	Early stage exploration; low risk or self-contained use cases; focus on awareness, skills or understanding potential benefit rather than immediate delivery.	Improved awareness and capability; better quality of proposals; clearer understanding of where AI adds value and what good looks like.

The following examples illustrate how each engagement model may be applied in practice.

AIIA led delivery

A large, cross industry initiative seeks to apply AI across multiple train operating companies and Network Rail routes, requiring coordination with RSSB and alignment across differing assurance expectations. The solution spans multiple technical environments, including deployment across different cloud platforms, and has no single organisation able to coordinate delivery end-to-end.

AIIA takes a leading role to orchestrate delivery, establish ownership and assurance routes, and develop reusable components and evidence to support adoption beyond the initial setting.

Field led delivery supported by AIIA

An organisation with existing machine-learning capability is developing an AI enabled tool for local operational use. Early results indicate potential value beyond the initial deployment, but progress is constrained by limited specialist capacity and uncertainty around assurance and transferability.

AIIA provides targeted technical expertise, co-design input and assurance support to accelerate delivery while the organisation retains ownership and accountability.

Guidance and assurance support

A well-owned project led by an organisation or an external partner, such as an academic group, is exploring an AI use case with similarities to work previously undertaken elsewhere in the sector. The team seeks guidance on governance expectations, assurance pathways and relevant lessons learned before proceeding further.

AIIA provides advisory input and shares prior learning to support alignment and reduce rework, without taking on delivery responsibility.

Inspiration and capability building

A team is exploring whether AI could be used to improve a low risk, self-contained process, such as automating routine analysis or extending an existing machine-learning model. The activity is exploratory and focused on understanding potential benefit rather than immediate deployment.

AIIA shares examples, standards and lessons learned to build confidence, improve capability and support informed decision making.

Engagement models are applied pragmatically and may evolve as initiatives mature, risks become clearer and system impact changes.

7.2 How AIIA prioritises

AI capability and capacity is scarce therefore prioritisation is fundamental to focus expertise and develop capability that deliver operational value, strengthen sector foundations and support safe progression into operational use.

Prioritisation is applied at a portfolio level, across AI enabled initiatives and pathfinders. This allows decisions to reflect system level impact, balance near term delivery with longer term capability building, and so learning and assets developed in one area can be expanded elsewhere.

Diversify & unify

Prioritisation favours activity that strengthens the system by shaping the portfolio toward reuse, including opportunities to transfer capability developed through pathfinders into other opportunity areas.

Horizon balance

Prioritised work is distributed across three complementary horizons, applied here to AI enabled capability:

- **Adopt** – applying proven AI enabled approaches through pathfinders where feasibility is understood and conditions for adoption are largely in place.
- **Adapt** – extending or combining existing capability so it can be applied in different operational contexts or scaled across organisations, including strengthening assurance evidence and operating model fit.
- **Invent** – developing new approaches through incubator pathfinders where capability does not yet exist or is not yet proven in a rail context, focusing on learning, de-risking and evidence generation.

Maintaining balance across these horizons supports near-term impact while continuing to build the foundations needed for sustained adoption.

Technology breadth

The portfolio spans a range of AI enabled capabilities suited to different types of operational and analytical challenge, including predictive, analytical, optimisation and language based approaches where they are appropriate to the task. Prioritisation avoids over reliance on any single technique and remains focused on selecting approaches that fit the problem, risk profile and operating context.

This helps capability remain adaptable as technologies evolve, without anchoring delivery to specific tools or transient technology trends.

Feasibility, workload and delivery conditions

Prioritisation takes account of timescale, feasibility and workload. This includes data readiness, the effort required to develop and validate models, and whether solutions can be delivered credibly within operational constraints. This does not exclude larger initiatives where system impact justifies the investment.

Sponsorship, ownership and responsible use

Work is prioritised where sponsorship, ownership and accountability are clear, and where the operating model conditions for adoption can be established. Responsible and proportionate use is also considered, with lower-risk decision support applications typically progressing more quickly, and higher-risk use cases requiring stronger justification and clearer evidence before advancing.

Routes to adoption

Prioritisation places early emphasis on credible routes to production and operational use. Proposals are assessed on whether solutions can be adopted and sustained in existing operations, including assurance readiness, workforce implications and the scale of business change required.

Value and wider considerations

Decisions are grounded in value for money and a clear justification for cost and effort. Initiatives are expected to demonstrate sustained benefit, informed by evidence from delivery and realistic assumptions about costs, impacts and longevity. Where appropriate, wider public value considerations should be considered alongside operational outcomes.

8. Return on investment

Understanding return on investment for AI is inherently difficult. Evidence from other industries shows that many AI pilots struggle to produce measurable financial benefit, and there is limited established track record to base assumptions on. This reflects how AI behaves differently from traditional software.

Some level of failure is expected when exploring new technology. Early activity will allow for fast, low-cost learning, with lessons captured and used to inform later work. This avoids situations where pilots grow too large to stop and resources remain focused on work with a clear route to adoption.

Several factors make return on investment (ROI) for AI challenging to calculate:

- Limited historical benchmarks make it difficult to predict performance, cost or longevity in the same way as established digital investments.
- Benefit estimates are often based on theoretical automation potential when adoption rarely mirrors these assumptions.
- Cost models differ from traditional IT, including usage-based pricing such as API calls and ongoing monitoring needs. These are sometimes omitted from planning.
- Maintenance and operational costs can increase over time as models drift or need updating.
- Specialist skills are in high demand, and associated costs can exceed standard rates.
- Technology changes quickly, creating both upside and downside risk. Solutions may improve significantly or become outdated sooner than expected.
- Process changes affect how benefits are tracked, particularly where time saved is reallocated rather than released.
- Measurement is complex if the introduction of AI fundamentally alters a workflow or decision pathway.

Given this, strict ROI calculations can be unreliable on their own. They remain useful as long as assumptions and uncertainties are acknowledged clearly. Templates and guidance can help organisations frame these estimates consistently.

Alongside financial return, organisations should consider factors such as operational resilience, safety improvement, job quality, customer experience and long-term capability. Framing value in a broader way helps decisions reflect both near-term feasibility and long-term strategic benefit.

26.1

Develop a simple, proportionate approach for estimating the value of AI enabled work.

Provides consistent templates and guidance for framing costs, benefits and uncertainty, helping organisations assess early activity in a realistic and comparable way.



Technology only delivers value when it becomes part of how we run the railway day-to-day. The opportunity with AI is in embedding it into operational business delivery that is clearly aligned to the performance outcomes we need.”

Richard Harrison,
Chief Financial Officer, DfT Operator Ltd



9. Opportunity areas

Each of the following sections sets out an opportunity area, how AI can strengthen its outcomes, existing progress across the sector, and representative pathfinders. They show how learning and capability developed in one setting can be applied elsewhere through the build out and build across approach.

The initial set of pathfinders will be refined and prioritised through progressive review, led by the Artificial Intelligence Incubator Accelerator (AIIA), reflecting evidence from delivery and readiness across the system.

PRIORITY PATHFINDERS	→ 9.1 Passenger & customer experience
	→ 9.2 Network operations
	→ 9.3 Network planning
	→ 9.4 Asset management – rolling stock
	→ 9.5 Asset management – infrastructure
	→ 9.6 Organisational processes



These opportunity areas focus attention on where AI can make a practical difference in the operational railway. They anchor activity in real settings, while deliberately building capability that can be reused and extended. Taken together, they describe how AI can strengthen customer experience, operational performance and resilience across the system.”

Adam Lowery
Technical Director, GBRX



9.1 Passenger & customer experience

Passenger experience is shaped by how simple, predictable and fair rail travel feels to those using the system. While many levers for these outcomes sit in planning and operations, this opportunity area focuses on interventions that directly affect passenger facing interactions, choices and understanding. Improvements elsewhere in the system are reflected here, only where they translate into outcomes that passengers experience directly.

Passenger and customer experience begins at the point a person considers making a journey. This includes understanding travel options, comparing routes and selecting the right ticket for their needs. Today, this is often difficult. Fares and restrictions vary across operators, and customers lack clear, personalised information to support confident decision making before they travel.

Once a journey is underway, the experience depends on timely and accurate information about train running, connections, disruption and station facilities. This information generated across multiple systems and organisations, which can result in inconsistent messages and delays in providing updates to passengers and frontline staff.

Improving passenger and customer experience requires a coherent approach across pre-journey planning, ticket selection, disruption management, accessibility and real-time information. AI can support this by anticipating issues earlier, tailoring information to individual needs and improving the consistency and timeliness of passenger information across the journey. As track and train responsibilities are brought closer together, AI enabled outputs provide a practical means to improve how information is shared, coordinated and presented to passengers during both normal operation and disruption.

How AI can strengthen passenger and customer experience

Effective operational performance is a prerequisite for successful customer experiences. AI can improve how the railway informs, guides and supports customers throughout their journeys, enabling consistency, predictability and personalisation. These capabilities also generate reusable components that, where appropriate, can inform adjacent operational and planning processes.

Strengthening fares, ticketing and retail reform by helping customers navigate simplified fare structures, identifying best value options, analysing retail choices and enabling transparent Pay As You Go (PAYG) interactions.

Using AI enabled insight to better understand customer context and needs, supporting more human centred design of passenger facing information and services.

Providing predictive, personalised journey information by anticipating delays, missed connections or disrupted routes, and surfacing tailored alternatives based on customer needs and preferences

Forecasting crowding and optimising passenger flow by predicting passenger volumes, platform congestion and potential delay triggers, enabling earlier operational interventions and safer movement within stations.

Delivering earlier and more consistent disruption information by combining inputs from Network Rail, operators and trusted third-party datasets to produce a unified, disruption picture for customers and staff.

Enhancing accessibility and inclusivity through automated translation, simplified language, British Sign Language (BSL) generation, and personalised navigation tools that adapt information to individual access needs.

Automating routine customer facing tasks by simplifying complex rules such as re-routing, ticket changes or compensation eligibility, and enabling faster, more consistent responses.

Together, these capabilities support a move toward more coherent, anticipatory and customer focused experiences.

Notable AI use and development across the sector

Over the last several years, there has been tangible progress in improving the quality, consistency and availability of customer information.

The Smarter Information, Smarter Journeys (SISJ) programme has delivered improvements to real-time information, customer facing tools and staff systems. This includes earlier and more accurate disruption alerts, improved facility and accessibility information, better consistency across channels, and upgrades to Darwin as the single source of truth. Customer satisfaction with information has risen by 10–15% since 2020, though challenges remain during disruption.

Operators such as LNER have advanced customer support automation, proactive journey change notifications, AI supported customer assistance and improved digital experience. These demonstrate the value of operationally grounded AI and data capability.

Third-party organisations and vendors continue to raise standards in ticketing, real-time information, disruption detection, personalisation and user-centred design, continuing to add innovative features such as Day Tripper options.

Machine learning is also being used to remove fraud from the Delay Repay scheme, enabling customers to be reimbursed on the same day as submitting a claim.

The Fares, Ticketing & Retail (FTR) reform programme is simplifying fares, expanding Pay-As-You-Go, accelerating fare reform and shaping a new retail proposition. These reforms will increasingly rely on AI to simplify complex fare rules, personalise retail options and provide transparency for customers.

Progress in this area means many passenger facing AI capabilities can be accelerated rather than incubated from first principles.

Integrated fares model for the Fares Ticketing and Retail programme

Passengers find rail fares too complex and often consider them poor value for money. The emerging integrated fares model will make fares fairer and easier to understand through removing confusing choices, with a maximum of three fare types to choose from for every journey, clearer terms and conditions and tap in tap out payments expanded across major cities.

The integrated fares model is the priority pathfinder for the Passenger and Customer Experience opportunity area. It is included as changes to fares structure result in a simpler, more transparent proposition that passengers experience directly. Simplifying products and clarifying rules supports more predictable outcomes and easier decision making across different journey types, including commuter, regional and long-distance travel, while also providing a clearer foundation for sustainable revenue and policy objectives for operators.

Where fares activity focuses primarily on internal pricing workflows, decision consistency or revenue optimisation, it is treated as a system or commercial enabler rather than a passenger experience intervention.

Retail agents

Retail agents address passenger friction that arises from complexity in the current fares and retail system.

Their contribution sits in supporting clearer choices, enabling more consistent outcomes and resolving issues more quickly where complexity leads to confusion or perceived unfairness. This is particularly relevant during disruption, system change or periods of transition.

As a supporting pathfinder within the Passenger and Customer Experience opportunity area, retail agents are explored as a time bound capability that assists passengers and frontline staff, while wider fares and retail simplification progresses. Deployed in this way, retail agents reduce the cognitive and operational burden experienced by passengers and staff.

On journey guidance and connection support

This pathfinder is focused on improving passenger experience during the journey by providing clearer, earlier and more consistent guidance.

Today, passengers face uncertainty around connection risks, platform changes, available options and the implications of delays for onward travel. The pathfinder would build the core capability needed to provide personalised prompts such as emerging delay signals, likely missed connections, recommended alternatives and guidance that can be surfaced through existing channels or trusted third parties.

The emphasis is on creating the underlying data, prediction and advice components that can be reused across multiple applications. Once in place, this foundation can support further capability such as crowding prediction, proactive station management and tailored accessibility support. It also strengthens wider system processes including incident management and recovery by ensuring staff and passengers receive aligned information from the same prediction and decision logic.



Simplifying processes that have historically constrained the rail industry's ability to deliver fares reform is a core focus. Through working closely with the GBRX team to explore how AI can accelerate fares reform and whole system pricing, removing long standing barriers and accelerating delivery of fares reform across the industry."

Stewart Fox-Mills
Fares, Ticketing & Retail Director, Great British Railways



Participating in the AI working sessions showed the value of aligning train operators, Network Rail and AI experts around a shared challenge. AI delivers real value when it supports the human at the heart of the passenger experience."

Anita Brown
Head of Innovation & Engagement, Avanti West Coast



AI-powered retail agents have real potential to reduce friction for customers navigating a complex fares and retail system. Used in the right way, they can help passengers make clearer choices, resolve issues more quickly and support frontline teams, particularly during disruption or periods of change, while wider fare simplification continues."

Danny Gonzalez
Chief Digital and Innovation Officer, LNER



9.2 Network operations

Network operations bring together the real-time activities that keep the railway moving. These activities depend on tightly interconnected, time-critical decisions across control rooms, maintenance teams and operators. In practice, they are supported by fragmented systems, partial data visibility and tacit knowledge distributed across organisations.

This constrains situational awareness, limits coordination during disruption, and makes it difficult to respond proportionately at system level. It is important to distinguish between preventing failures and managing their impact. Many operational failures lack clear precursors, and improvements in this domain are therefore driven primarily by stronger resilience, contingency planning and response, rather than the elimination of failure itself.

How AI can strengthen network operations

AI can strengthen Network operations by improving how the railway anticipates, manages and recovers from operational events. Its primary contribution is to operational resilience and response, rather than preventing all failures. By supporting more consistent decision making across control, maintenance and operational teams, including consideration of crew availability, deployment constraints and geographic response times, AI helps coordinate proportionate action across the system. These capabilities also create reusable components that support planning, customer information and asset management.

Predicting emerging incidents and performance risks by analysing train running data, asset telemetry, weather patterns and historic behaviour, to identify issues such as reactionary delay, infrastructure failures or dwell time deviations before they escalate

Supporting control and operational teams with transparent decision support, surfacing predicted delay propagation, feasible recovery options and likely customer and operational impacts, while keeping human oversight central.

Rapid hazard detection identifies signs of low adhesion, vegetation encroachment, and restricted movement. It reduces dependency on driver reporting, allowing better anticipation and informing control decisions.

Improving incident response and communication flows by mapping real-time constraints across operators, maintenance teams and stations, enabling more coordinated and consistent actions during disruption.

Bringing maintenance planning and real-time operations together by linking asset degradation with operational patterns, aligning maintenance with access and strengthening whole system resilience and performance.

Improving safety outcomes by identifying high risk situations earlier, such as trespass likelihood, suicide risk, adverse weather or degraded infrastructure, enabling proportionate mitigation.

Reducing dependency on tacit knowledge by structuring operational rules, local practices and historical learning into models that support staff across all control locations.

Extending operational understanding beyond the immediate incident, using analytics and predictive models to inform future timetables, access strategies and recovery plans.

Strengthening understanding of performance drivers, complementing traditional outcome measures with insight into the underlying behaviours, constraints and interactions that shape network performance

Supporting forward-looking operational decision making through scenario and “what-if” modelling, helping teams explore how different choices affect performance over days, weeks and longer.

Taken together, these capabilities reinforce the foundations needed for improvement across planning, customer experience and asset management.

Notable AI use and development across the sector

Across the industry, organisations are beginning to strengthen operational and maintenance decision making through more data driven approaches. It provides foundations for future AI enabled improvement and new capability is intended to augment existing tools and practices rather than replace them.

Network Rail is exploring emerging technologies to surface risks and patterns earlier for key assets such as switches and crossings, earthworks and signalling. Greater sensor coverage, more structured asset data and tools such as the insight platform are beginning to support earlier prioritisation of inspections and maintenance activity, while operational and engineering teams retain responsibility for decisions and interventions.

As part of wider performance improvement programmes, the Wales and Western region have tested enhanced operational visualisation and decision support tools that improve situational awareness and enable earlier intervention during incidents. These approaches support more consistent responses during disruption, without altering established accountability or control arrangements.

Industry wide work on incident response and emergency management has also matured. Shared playbooks, joint learning reviews and updated codes of practice are strengthening cross organisational coordination. This creates clearer pathways for integrating predictive or AI enabled insight into established operational processes as capability develops.

Suppliers continue to develop AI enabled safety and security tools, including computer vision applications for trespass detection, environmental risk identification and monitoring of constrained environments. These tools sit alongside existing safety systems and focus on enhancing awareness and early warning.

Across operators and maintainers, there is growing interest in automating selected manual operational tasks such as triage, decision logging and elements of resource scheduling. This reflects a wider intent to embed digital support directly into frontline workflows, improving consistency and reducing administrative burden, while retaining professional judgement.

Taken together, this activity shows a sector moving from foundational data integration toward more structured decision support across operations and maintenance. While maturity varies and most initiatives remain exploratory, the direction of travel is toward earlier insight, coordination and prioritisation as a basis for future AI enabled development.

Incident management

This pathfinder focuses on strengthening incident management by supporting teams working under time pressure with clearer information and more consistent workflows.

Its primary value lies in understanding the likely trajectory of an incident, including when key stages are expected to begin and end, rather than only classifying what has already occurred. Establishing a shared view of how an incident is likely to unfold allows the same prediction to be used across control, customer information, crew and rolling stock planning, supporting earlier mobilisation of resources, more consistent decision making and clearer communication with passengers and staff during disruption.

While some incidents will continue to occur without meaningful precursors, AI enabled techniques such as pattern detection, prioritisation and recommendation can help classify incidents, identify likely contributing factors, surface relevant response options and improve the flow of information across systems and teams. These capabilities are intended to augment existing operational tools and professional judgement, rather than replace them, and to integrate with established workflows.

This pathfinder is compelling because improvements to incident response support performance, passenger experience and staff workload. It also surfaces the conditions required for safe AI use in real-time operational environments, including data integration, workflow design, assurance expectations and clear human oversight. The reusable components developed, such as workflow patterns, decision support guardrails and structured operating procedures, can be applied in adjacent operational contexts.

Train service recovery

This pathfinder improves service recovery through predictive, data driven decision support that strengthens operational resilience.

It applies data science and AI to operational data across crew, rolling stock, incidents and demand to anticipate disruption impacts and support recovery decisions, including scenario modelling and coordinated operational and customer responses across track and train.

The primary value lies in reducing delay minutes and improving consistency through earlier recovery planning and more effective deployment of crew and rolling stock. Over time, the capability can develop into dynamic, near-real-time service management that supports proactive control during disruption.

Delivery depends on shared data foundations, integration across operational systems and assurance and change activity that build confidence in use. Reusable components such as predictive models, optimisation approaches and structured recovery workflows can be applied in adjacent operational contexts.



As we move towards GBR, we have the opportunity to join our railway together vertically, horizontally and digitally. Applying whole systems thinking, enabled by data and AI, has the potential to improve our railway fundamentally and irreversibly.”

Steve White
Managing Director,
South Eastern Railway



Performance & sub-threshold delay analytics

Sub-threshold delay creates material cumulative impact on network performance, even though individual events often fall below the thresholds for formal investigation.

Existing performance mechanisms recognise this effect but lack the visibility needed to isolate causes and target action consistently across the system.

This pathfinder uses AI enabled analytics to make these patterns visible at system level. By analysing recurring micro-frictions across time, location and operating context, it will help the industry understand where avoidable delay originates and where intervention will have the greatest effect. The work will build on existing industry data, and platforms such as Network Rail's State of the Railway Compiler (SORC).

The value of this pathfinder lies in making systemic sub-threshold delay visible and actionable. Outputs will feed directly into existing performance, planning and operational decision processes, supporting targeted interventions such as timetable adjustments, operating practice changes and asset or access planning. Scenario testing will allow proposed changes to be assessed before implementation, strengthening confidence in decisions. This makes the pathfinder suitable for early delivery and enables reusable analytical features and intervention patterns that support more predictable decisions and sustained improvement in timetable resilience.



As a railway, we are continually looking at ways to improve how we communicate with our customers. AI has the potential to transform how we get timely and accurate information to our customers, personalised to meet their travel needs whilst not losing the human touch which we know many find so valuable.

Lawrence Bowman
Managing Director,
South Western Railway



Turning free text into structured, actionable data

The Control Centre Incident Log contains essential operational information, but much of the detail is recorded only in free text, limiting its use in analytics, prediction and decision support.

This pathfinder uses AI techniques to extract structured operational fields from free text entries, enabling more consistent incident classification, clearer understanding of response timelines and better visibility of root causes. The approach has already demonstrated value in areas such as trespass analysis, stranded train investigations and rough ride pattern detection, while also highlighting data quality issues that can be fed back into improved recording practice.

The underlying workflow is configuration based, making it easy to adapt to any free text domain and suitable for scaling across the network. Over time, this capability can build out into broader incident understanding and continuous improvement processes, and build across into other operational, engineering and customer communication systems, where unstructured data limits visibility today.



Our railway already generates extraordinary amounts of operational information, much of it captured differently across the system. The opportunity now is to apply AI to turn that into insight we can use at scale, strengthening how we run the railway and improving outcomes for passengers.”

Jamie Burles
Managing Director,
Anglia Railway



Maintenance planning intelligence

This pathfinder focuses on strengthening how maintenance, access and possession planning and re-planning are undertaken, recognising their direct impact on network operations and service delivery.

It brings together information that is currently held in separate systems or assessed manually to support more effective sequencing and packaging of work. This includes evaluating asset location, access constraints, understanding resource and competency availability, and coordinating maintenance activity with operational plans. The same capability supports dynamic re-planning when conditions change, such as late running services, emerging asset issues or loss of access, allowing decisions to be adjusted using shared, up-to-date evidence.

As capability matures, the pathfinder can incorporate possession strategy, coordination with service delivery and re-certification planning. The intent is to improve how maintenance, access and operations decisions are planned, adjusted and executed together, reducing disruption and improving system resilience.

Contextual performance planning

This pathfinder focuses on improving how future performance risk is anticipated in network operations by moving beyond simple historical comparisons toward context aware forecasting.

Current performance comparisons are often anchored to benchmarks such as, this time last week, or, same period last year. While familiar, these comparisons rarely reflect the conditions that shape operational outcomes, including weather, seasonal demand, special events and network loading. As a result, they provide limited support for proactive planning and readiness.

The pathfinder develops capability to identify the closest historical analogues to an upcoming operating period, and to use these to forecast likely performance pressures. This insight is used to inform earlier and more proportionate preparation, such as winter readiness, adhesion response and resource positioning, strengthening operational resilience without relying on hindsight.

9.3 Network planning

Network planning brings together the long-term, medium-term and short-term activities required to design timetables that balance reliability, capacity, revenue, freight growth, network resilience and performance.

Progress in this area is constrained by fragmented data ownership, manual preparation and planning rules that are not consistently digitised or applied across the industry. Planning teams spend significant effort assembling and reconciling inputs before options can be explored, limiting the ability to test alternatives, assess resilience and respond to change.

Passenger demand and revenue considerations sit within Network planning because they shape decisions on capacity, service configuration and timetable structure. Improvements in forecasting and segmentation inform these decisions, with benefits realised through more predictable, resilient network plans rather than direct passenger facing interventions.



When applied properly, AI strengthens network planning by improving the quality of decisions, not just the speed of processes. It enables planners to test alternatives, understand resilience and optimise passenger and freight outcomes with a clearer evidence base, supporting more predictable and robust network plans.”

Anit Chandarana
Group Director,
Systems Operator,
Network Rail



How AI strengthens network planning

AI can improve how planners design, validate and optimise timetables, strengthening both the quality and efficiency of the planning process. These capabilities also generate reusable components that support operations, performance and customer experience.

Supporting more consistent planning by codifying planning rules, historic decisions and constraints into machine readable logic, reducing reliance on individual interpretation and lowering variability across teams and regions.

Enabling faster exploration of options by generating structurally compliant timetable variants aligned to infrastructure capability and operational constraints, allowing planners to focus on trade offs rather than manual construction.

Improving resilience testing by simulating disruption scenarios, analysing reactionary delay and surfacing hidden constraints earlier in the planning process

Optimising passenger freight trade offs by analysing strategic passenger train and freight paths, potential conflicts and opportunities for redesign that supports both freight growth and passenger reliability.

Strengthening the evidence base for planning decisions by linking timetable options to whole system considerations such as infrastructure capability, power supply limits, sectional run times and driving behaviour.

Anticipating seasonal patterns and major event impacts by learning from historical demand, weather linked performance issues and planned event schedules to improve timetable robustness.

Reducing process variability by embedding consistent logic that reduces dependency on tacit knowledge and supports consistent planning across teams and regions.

Together, these capabilities support a more consistent, evidence based and forward looking planning process.

Notable AI use and development across the sector

Across the industry, early foundations for improved planning are beginning to take shape, even though maturity varies across organisations.

Network Rail has increased the use of operational performance data and introduced more structured modelling approaches to support key planning activities. Some regions have developed early tools to support planners in validating options or visualising the performance impact of planned changes.

Freight operators, passenger operators and Network Rail have together begun exploring how to clarify freight-passenger interactions, test alternative patterns and understand operational trade offs earlier in the planning cycle.

A timetable checking agent at LNER that validates short-term plan updates before tickets are released for sale, reducing the risk of selling invalid or unworkable journeys.

Localised pilots across operators and devolved authorities have trialled improved multimodal coordination, aligning rail services with bus and metro connections at key interchanges, using passenger flow and demand forecasting to shape departure patterns.

Suppliers have developed enhanced planning and simulation tools that can support early stage evaluation of timetable options, demonstrating the value of data driven approaches even where full automation is not yet in place.

Taken together, this activity reflects a growing use of predictive and analytical approaches to strengthen planning. Progress remains constrained by fragmented data, inconsistent rule sets and reliance on manual processes.

Automated timetable generation

This pathfinder focuses on the rapid generation and assessment of multiple structurally valid timetable options to support strategic, blank-sheet timetable design.

AI enabled methods are used to explore a wider range of compliant options earlier in the planning process, with conflict detection, rules compliance and validation applied as downstream assurance rather than the primary source of value. Simulation is used to evidence trade offs between performance, cost, crew and rolling stock before committing to a preferred option.

Automated timetabling can reduce the time and manual effort required to produce credible timetable options and improve consistency by applying planning rules and constraints in a repeatable way. It can provide a clearer evidence base for comparing alternatives and support faster iteration where planning decisions involve complex trade offs. Early work on the Eastern region and East Coast route provides a practical starting point for discovery and learning.

This pathfinder is well suited for early delivery because the problem is well understood, required datasets are known and planning teams are already engaged. It is expected to produce reusable components such as option generation logic, validation artefacts and workflow patterns that can be applied across wider timetable and capacity planning activity, supporting more predictable, efficient and confident planning decisions.

Improving the base plan

Improving the base plan focuses on identifying and addressing structural weaknesses that exist even on days of low perturbation.

Sub-optimal sectional run times, dwell assumptions and planning values can accumulate across the network, reducing reliability, increasing crew and rolling stock inefficiency, and constraining recovery headroom. AI can help analyse stable performance conditions to surface where the timetable under-delivers against its own assumptions, providing a clearer evidence base for adjusting how the base plan is constructed.

This pathfinder strengthens the link between operational evidence and planning decisions by feeding consistent insight from performance data back into the refinement of planning rules and values. It offers a practical route to early value, as improvements to the base plan have direct and measurable impact, and addresses a shared system challenge that benefits coordinated delivery across operators and Network Rail. Reusable analytical patterns and evidence based planning logic can then be applied across timetable development and capacity planning, supporting a more consistent, whole system approach to defining and improving timetable quality.

9.4 Asset management – rolling stock

Rolling stock asset management ensures trains remain safe, available and reliable through maintenance, defect management, fleet planning and long-term lifecycle decisions.

Across the fleet, data availability and quality vary significantly. Newer trains generate rich telemetry, fault and diagnostic data, while older fleets often rely on legacy systems or limited digital records. In addition, data custody and contractual arrangements with OEMs and ROSCOs can constrain operator visibility, making cross fleet insight uneven and difficult to compare.

As a result, insight is not always translated into consistent engineering or operational decisions. Maintenance remains reactive or calendar driven, and the links between operating conditions, asset degradation and fleet availability are not always visible.

Insights generated in depots, on trains and in operations is not consistently shared across organisational boundaries, limiting the ability to understand recurring defects, target interventions or optimise scarce engineering and depot resources.

Improving rolling stock asset management therefore depends on more connected data, predictable information flows and models that reflect real operating conditions. AI can support this by turning fragmented fleet data into consistent, actionable outputs, strengthening defect understanding and supporting earlier, better informed decisions across maintenance, operations and planning.



AI can play a practical role in fleet maintenance optimisation, helping to prioritise and sequence the workbank for each train. This relies on the use of operational data that is representative of real world constraints, such as depot capacity, passenger demand, and the maintenance plan.”

Ben Parry
Engineering Director, Greater Anglia



How AI strengthens rolling stock asset management

AI can strengthen how operators, ROSCOs and maintainers understand and manage the condition, availability and performance of rolling stock. Its primary contribution is enabling earlier insight, more consistent decisions and clearer alignment between engineering, operations and planning, particularly where data is fragmented or decisions must be taken under time pressure.

By structuring and interpreting fleet data that is currently dispersed across systems and organisations, AI can help move rolling stock management from reactive and calendar based approaches toward more predictive and coordinated decision making. These capabilities also generate reusable components that support wider operational, planning and customer outcomes.

Turning raw telemetry and defect data into consistent decision ready insight by integrating fault codes, sensor readings, maintenance history and driving patterns into consistent and usable models

Predicting component degradation and emerging failures to support earlier interventions and reduce unplanned failures that lead to cancellations and short forms.

Inferring asset condition where telemetry is limited, using historical patterns and sparse signals, rather than relying solely on direct measurement.

Supporting optimised maintenance planning by recommending the timing of exams, servicing and replacement, aligned with operational access and depot capacity.

Improving day-of-operation fleet decisions with real-time telemetry, active defects and servicing needs to identify pairings that protect service delivery.

Linking operational conditions to degradation patterns to understand how driving behaviours, dwell patterns, seasonal effects and infrastructure condition shape recurring faults.

Improving cross industry visibility of fleet health where shared insight from ROSCOs, operators and Network Rail highlights underlying asset or infrastructure conditions.

Optimising depot workflows by linking planned work, staff competence, tool availability and materials allocation, improving throughput and reducing avoidable delays.

Together, these capabilities support a shift toward more predictive, integrated and system wide fleet management.



Notable AI use and development across the sector

Across the sector, operators, ROSCOs and manufacturers have expanded the use of digital telemetry, remote condition monitoring and advanced sensing across an increasing proportion of fleets. While maturity varies, this activity is strengthening the data foundations required for more predictive and coordinated fleet management.

Rolling stock condition understanding is increasingly derived from a combination of on train telemetry and fixed location sensing owned by infrastructure managers. Track-based systems such as Wheel Impact Load Detectors (WILD), pantograph cameras and Automated Vehicle Inspection Systems (AVIS) provide low-cost, scalable signals that inform both fleet and infrastructure condition, highlighting the importance of shared insight at the wheel rail interface.

On train data, including braking system health, wheel condition and fault reporting, is becoming more consistently captured on newer fleets. Together, these approaches demonstrate how trains are evolving into sensing platforms that contribute to system wide understanding rather than isolated fleet views. Alongside this, some operators are beginning to embed decision support tools into real-time engineering and control workflows.

Depots and maintenance teams are also digitising handovers, defect triage and work-order management, improving data quality and reducing reliance on tacit knowledge. In parallel, early initiatives by operators and suppliers are linking maintenance schedules, servicing requirements and fleet availability to support more informed allocation decisions, even where data quality varies across fleets.

Taken together, this activity reflects a sector moving beyond isolated dashboards toward structured data, shared signals and early predictive techniques. While most capability remains foundational, it provides a credible platform for the next stage of AI enabled improvement, where consistent data, reliable models and integrated decision routes support more proactive and efficient rolling stock management.

Predictive degradation modelling

This pathfinder focuses on identifying early signs of failure in a high impact rolling stock component or sub-system, such as doors, engines, HVAC compressors or traction converters.

By combining telemetry, defect codes, maintenance history and operational conditions, AI can surface patterns that indicate emerging issues before they become service affecting. This supports earlier engineering intervention, protects fleet availability and reduces cancellations and short forms linked to avoidable defects.

This pathfinder is well suited to early delivery because the scope is deliberately narrow, and the boundaries are clear. While relevant data is currently dispersed across operators, maintainers and ROSCOs, it already exists for targeted components if it can be brought together in a controlled way. This allows teams to develop, validate and assure a focused predictive model without requiring whole-fleet transformation. The resulting feature sets, data patterns and assurance evidence can then be reused across other components and fleets, supporting a dependable and proportionate introduction of AI into engineering decisions.

AI supported depot defect triage

Depot defect triage is a high volume, safety critical workflow in which engineering teams assess reported faults, diagnose likely causes, prioritise work and determine appropriate interventions.

Today, work orders are largely free text, fault codes are inconsistently applied, and coding schemes are often outdated. Common unplanned defects lack shared templates, making it difficult to distinguish symptoms from root causes and increasing the risk of repeat misdiagnosis.

This pathfinder strengthens fault diagnosis and triage by using AI to identify recurring defect patterns, surface likely causes and highlight dominant fixes observed historically. Unsupervised clustering and pattern extraction help consolidate free text records into structured diagnostic groupings, enabling faster, more consistent assessment while keeping professional engineering judgement central. Over time, this would produce shared templates for common defect types and reduces repeat investigations caused by inconsistent interpretation.

The pathfinder is well suited to early delivery because depots already hold relevant telemetry, inspection notes and repair histories. The workflow is repeatable and well understood, with clear safety boundaries, allowing AI enabled diagnostic support to be tested without introducing operational risk. In parallel, the work improves data quality at the point of entry and creates reusable triage structures that can be applied across depots and fleets, supporting more predictable maintenance outcomes.

In addition, the pathfinder supports better execution of depot work by helping teams sequence tasks around isolations, safety constraints, work instructions, staff competence and tooling availability. By improving visibility of progress, constraints and emerging issues during maintenance activity, it reduces avoidable delay caused by rework, mis-sequencing or late discovery of conflicts.

9.5 Asset management – infrastructure

Infrastructure asset management depends on understanding the condition, performance and risk profile of assets across the network and acting on that information in a timely and consistent way. Today this is constrained by fragmented data, the utilisation of manual inspection, and the need for experts to interpret large volumes of information across multiple sources.

AI can improve this by bringing together data from inspections, remote monitoring, maintenance systems and operational reports, and using it to provide earlier and clearer understanding about asset condition. This includes detecting defects, predicting failures, identifying emerging risk patterns and helping teams direct maintenance effort more effectively. As asset information becomes more structured and consistent, AI can also support planning activities such as maintenance route optimisation, work packaging, resource allocation and the management of competencies.

These improvements provide better evidence, a more consistent baseline and more time for specialists to focus on decisions that matter most for safety, reliability and cost.

How AI strengthens infrastructure asset management



Scotland's railway exists to connect people, communities and opportunity. As we embrace new tools and data driven ways of working, AI has the potential to strengthen how we manage assets, predict performance and improve resilience – enabling us to deliver more reliable, efficient journeys for our passengers and freight customers. Building these capabilities across our engineering and asset teams will ensure Scotland's network continues to perform safely and sustainably, responding to the needs of the people and places we serve.”

Alan Ross
Director Engineering & Asset Management,
Network Rail, Scotland's Railway



AI can materially improve how infrastructure assets are inspected, assessed and planned, enabling earlier insight, more consistent decisions and better allocation of maintenance effort. These capabilities also create reusable building blocks that support planning, operations and investment decisions.

Supporting more consistent inspection through computer vision models that interpret images and video, highlight defects and reduce reliance on manual review.

Predicting degradation and failure risk by combining historic maintenance, environmental context, operational load and inspection findings to identify emerging issues earlier.

Strengthening planning decisions through optimisation and simulation that help package work, allocate resources, coordinate access and evaluate alternative scenarios.

Improving the quality of asset information by using AI to extract structure from free text engineering logs, incident reports and historic documents.

Enabling more coherent access planning by aligning maintenance windows, asset risk, resource availability and network constraints.

Supporting competency and resource planning by identifying where skills, re-certification needs or resource gaps may affect delivery of the maintenance plan.

Together, these capabilities shift the approach from reactive and fragmented to evidence based and future looking.

Notable AI use and development across the sector

Across the infrastructure domain, organisations are demonstrating the practical value of using AI and advanced analytics to strengthen infrastructure asset management.

Network Rail has developed a growing set of data driven tools, including ASCEND for earthworks, STREAMS for drainage, and cross-discipline platforms such as insight, DLI and Citadel. These tools bring together asset condition, performance data, fault logs and environmental factors. Taken together, these platforms improve visibility of emerging risk, support more consistent assessment of asset condition and help target inspection and intervention activity where it is likely to have the greatest impact.

On train systems such as LiDAR, forward facing video, thermal imaging and instrumented pantographs already support defect identification on rolling stock and help detect infrastructure related issues including OLE misalignment, track geometry anomalies and railhead adhesion risks.

Computer vision is becoming an increasingly useful part of the infrastructure toolkit. Train mounted and fixed cameras are being applied to identify track defects, vegetation growth, drainage issues and changes in structural condition. Automated analysis reduces reliance on manual review and improves the consistency and timeliness of issue identification, while remaining embedded within established inspection and assurance processes.

Suppliers have demonstrated how image based analytics can help classify defects, prioritise follow up activity and support engineers with clearer, evidence based assessments of asset condition. These approaches are designed to augment specialist engineering judgement rather than replace it, and to integrate with existing maintenance and inspection regimes.

There has also been progress in analysing operational and signalling behaviour to better understand how infrastructure performance contributes to delay via Network Rail's State of the Railway Compiler (SORC) programme. Emerging methods combine train movement data, signalling events, timetable feeds and geospatial information to reconstruct how infrastructure operated in the lead up to incidents, strengthening understanding of recurring patterns that affect performance.

Taken together, these examples show how targeted, well scoped applications of AI and analytics can strengthen infrastructure asset management, improve data quality and generate reusable components that support wider capability across operations, planning and asset stewardship.

Multi-sensor data integration for better infrastructure condition understanding

Infrastructure teams rely on information dispersed across inspection images, train-borne monitoring, lineside sensors, weather feeds, seasonal indicators and engineering reports.

Each source provides value, but they are not brought together in a way that shows how asset condition is changing over time or where deterioration is beginning to emerge. The pathfinder would focus on creating a coherent condition picture for a specific asset by combining these signals, linking them to their historical context and structuring them into explainable, engineer ready insight. This includes identifying early trends in degradation, highlighting locations where environmental or operational factors accelerate wear, and providing concise summaries that can be used directly in existing engineering and maintenance processes.

Seasonal scenarios offer a practical place to begin because engineers already understand how heat, rainfall, vegetation, drainage, track condition and operational patterns interact over time and affect performance. Starting here provides a controlled environment to test the approach before expanding to other asset classes. Over time, this same multi-sensor data integration capability can support more targeted intervention planning, more efficient access scheduling, earlier recognition of emerging risks and better alignment between engineering decisions and operational need. This creates a reusable foundation for predictive maintenance, resilience planning and long-term renewals prioritisation, while strengthening the connection between engineering judgment and data driven insight.

9.6 Organisational processes

Organisational processes cover a wide range of business, administrative and support processes that enable the operational railway to function. This includes governance and assurance, standards, corporate reporting and other information intensive functions that sit alongside day-to-day operations, spanning technical, finance, HR, commercial and procurement, safety, programme delivery, legal services and general corporate activity.

These functions are essential to safety, performance and compliance, but they often rely on manual collation, narrative reporting and local expertise. Systems, workflows and data quality vary significantly across organisations, making it difficult to reuse information consistently or draw insight efficiently. As a result, Organisational processes remain manual and time-consuming, even where the underlying information already exists.

While operational use cases naturally attract attention, the organisational process environment contains some of the most achievable early opportunities for AI. These processes typically do not interface directly with the live railway or introduce system safety considerations, allowing solutions to be explored, delivered and scaled more quickly. The benefits include tangible productivity gains, reduced administrative burden and improved access to organisational knowledge, while helping build confidence and capability ahead of more complex operational adoption.

How AI strengthens organisational processes

AI can strengthen organisational processes by reducing the manual effort required to interpret, move and reuse information across business, assurance and support functions. Its primary value lies in converting narrative heavy and fragmented inputs into structured understanding that can be applied consistently, improving efficiency, quality and organisational memory.

Key contributions include:

Structuring unstructured information, by converting free text from reports, logs, correspondence, contracts and safety records into consistent, searchable and analysable formats that reduce manual collation and rework.

Supporting procurement and supplier management, by assisting with tender evaluation, contract clause interpretation and supplier performance monitoring, while keeping decisions with accountable teams

Improving assurance, safety and compliance workflows, by identifying patterns across incident logs, audit findings and assurance activity, supporting preparation, review and follow-up without changing underlying accountabilities.

Enhancing workforce and capability management, through skills mapping, competency tracking, training recommendations and support for consistent interpretation of policies and standards.

Strengthening commercial and financial insight, including cost categorisation, spend analysis, benchmarking and contract interpretation, improving transparency and consistency in decision making.

Improving access to organisational knowledge, helping staff locate relevant information, understand precedent and apply guidance more consistently across teams and organisations.

Together, these capabilities reduce reliance on local expertise, improve the quality and consistency of organisational process decision making, and create reusable data structures and workflows that strengthen the foundations for AI adoption across the wider system.

Notable AI use and development across the sector

Across finance, HR, safety and corporate processes, early adopters have already demonstrated how small, targeted AI deployments can deliver measurable value.

Several operators have trialled AI supported document summarisation, automated compilation of safety reports, customer correspondence analysis and internal knowledge assistants. GBRX has supported the redesign of an LLM based workflow that extracts structured data from Control Centre Incident Logs, improving data quality and enabling new analytical insight.

Network Rail has experimented with intelligent document extraction for engineering and procurement processes, and suppliers are offering agent based tools for contract interpretation, spend categorisation and assurance. These examples show that internal AI is already emerging organically across the sector and is well suited to systematic scaling.



The railway faces sustained cost and productivity pressures, alongside rising expectations from passengers and freight customers. Artificial intelligence gives us a practical opportunity to optimise how resources are used across the system, improving planning, reducing inefficiency and targeting intervention where it delivers the greatest value. Done properly, this is about strengthening financial sustainability while improving performance, not cutting corners.”

Paul Marshall
Chief Financial Officer, Network Rail



Turning internal free text into structured and actionable insight

A strong early pathfinder is applying AI to convert unstructured corporate data such as reports, logs, correspondence and narrative-based processes, into consistent structured formats that can be searched, analysed and used to inform decisions.

This builds on work already seen in operational logging and can extend across safety, commercial, HR and finance functions. The emphasis is on creating reusable extraction and classification components that can be rapidly adapted to any domain, improving data quality and reducing manual effort.

Competency and re-certification planning

Many internal HR processes depend on complex rules, decentralised spreadsheets and fragmented training data.

An AI enabled competency planning tool could map skills, flag expiries, recommend training pathways and surface gaps, improving workforce readiness while reducing administrative workload. This can link directly to maintenance-planning and workforce allocation needs.

Intelligent commercial and procurement support

AI can assist commercial teams by identifying patterns in spend, extracting key information from large contract sets, summarising supplier performance, and supporting the generation of tender questions or evaluation guidance.

This helps reduce cycle times, improve consistency and create a clearer evidence base for decisions.

Finance and back office workflow optimisation

AI-assisted invoice validation, cost categorisation, forecasting support and automated reporting represent fast, low risk gains. These interventions reduce manual rework, improve data accuracy and allow finance teams to focus more on value added analysis.

These pathfinders collectively demonstrate how AI applied to Organisational processes can deliver meaningful progress at pace, strengthening capability across the sector and supporting the wider adoption of AI in more complex operational environments.



Across finance and corporate functions, the early use of AI highlights how small, focused interventions can improve the quality and consistency of information. For organisations undergoing change, the opportunity lies in scaling these capabilities thoughtfully, with strong governance, so they support better decisions and long-term organisational resilience.”

Samantha Turner
Finance Director, South Western Railway



10. Closing statement

This action plan sets out a deliberate, rail specific approach to adopting artificial intelligence within a complex, safety critical system.

It reflects both the rapid development of AI capability and the operational, organisational and assurance realities of the railway. By grounding AI adoption in how the railway is planned, operated and maintained in practice, the plan provides a structured framework that supports progress while maintaining safety, accountability and public trust.

The plan responds to the conditions in which the railway operates, including sustained demand pressure, constrained capacity, cost challenges and significant workforce demographic change. These pressures shape how new technology can be introduced and embedded. Addressing them requires strategic technologies like AI that create foundational capability whose value is leveraged into operational decision making and actions.

Orchestrated action is central to the approach set out in this plan. The distribution of responsibility across infrastructure and operations, assets and services, and public and private organisations influences how technology is adopted and scaled.

The plan therefore focuses on shared foundations for data, governance, assurance, skills and delivery. These foundations enable organisations to act with greater confidence and pace, while retaining accountability for railway outcomes. Delivery follows a federated model, with adoption inherently with those responsible for operational performance supported by expert capability.

Progress is advanced through purposeful pathfinders operating in real environments. These generate evidence, reusable artefacts and delivery patterns that inform wider adoption. Pathfinders are supported by parallel work to strengthen the shared foundations required to scale AI safely and sustainably across the railway. Implementation spans multiple horizons, combining acceleration of proven applications, investment in enabling capability and incubation of new opportunities, with learning used to refine priorities over time.

This action plan establishes the conditions for responsible, scalable AI adoption grounded in operational reality. Success will be reflected in sustained capability, effective reuse and tangible improvements in how the railway is planned, operated and maintained.

In doing so, this plan seeks to harness one of the most consequential opportunities of our time, aligning the adoption of artificial intelligence with a period of integration and reform to support the development of a more capable, reliable and resilient railway for passengers, freight and the wider economy for generations to come.



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