



Department
for Transport

Transport in the Age of AI

AI - What is it and what it means for you

7th May 2025

OFFICIAL

The Broader Context



Long-term vision for digital public services, emphasising the need for a modern, interconnected digital government.

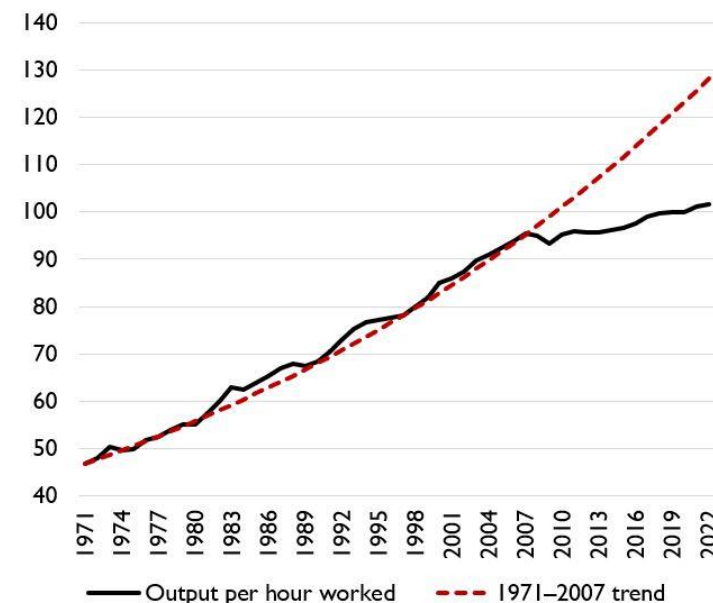


Reasons for adopting AI: Economic Growth, Job Creation & Productivity Increases.



Guidance on how to implement AI in government, including best practices and case studies.

The productivity gap

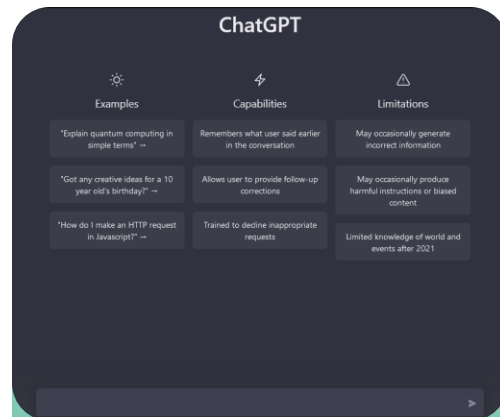


What is AI?

“ machines that perform tasks normally requiring human intelligence ”

Generative AI

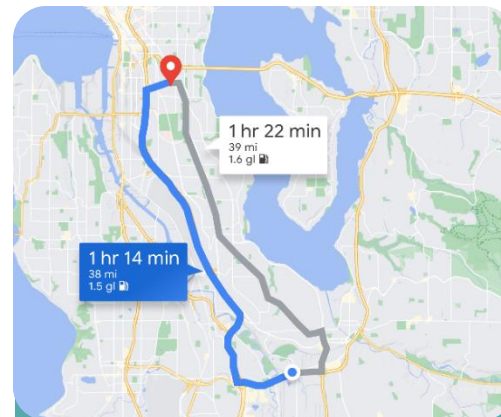
creates new content
(text, images, videos, audio)



AI language tools (such as ChatGPT) to draft, summarise, analyse or translate text

Predictive AI

predicts or recommends
outputs



Travel routing optimisation systems, predicting traffic based on previous travel patterns and live data

Perceptive AI

processes sensory
information



Facial recognition technology to assess if a passport photo matches criteria

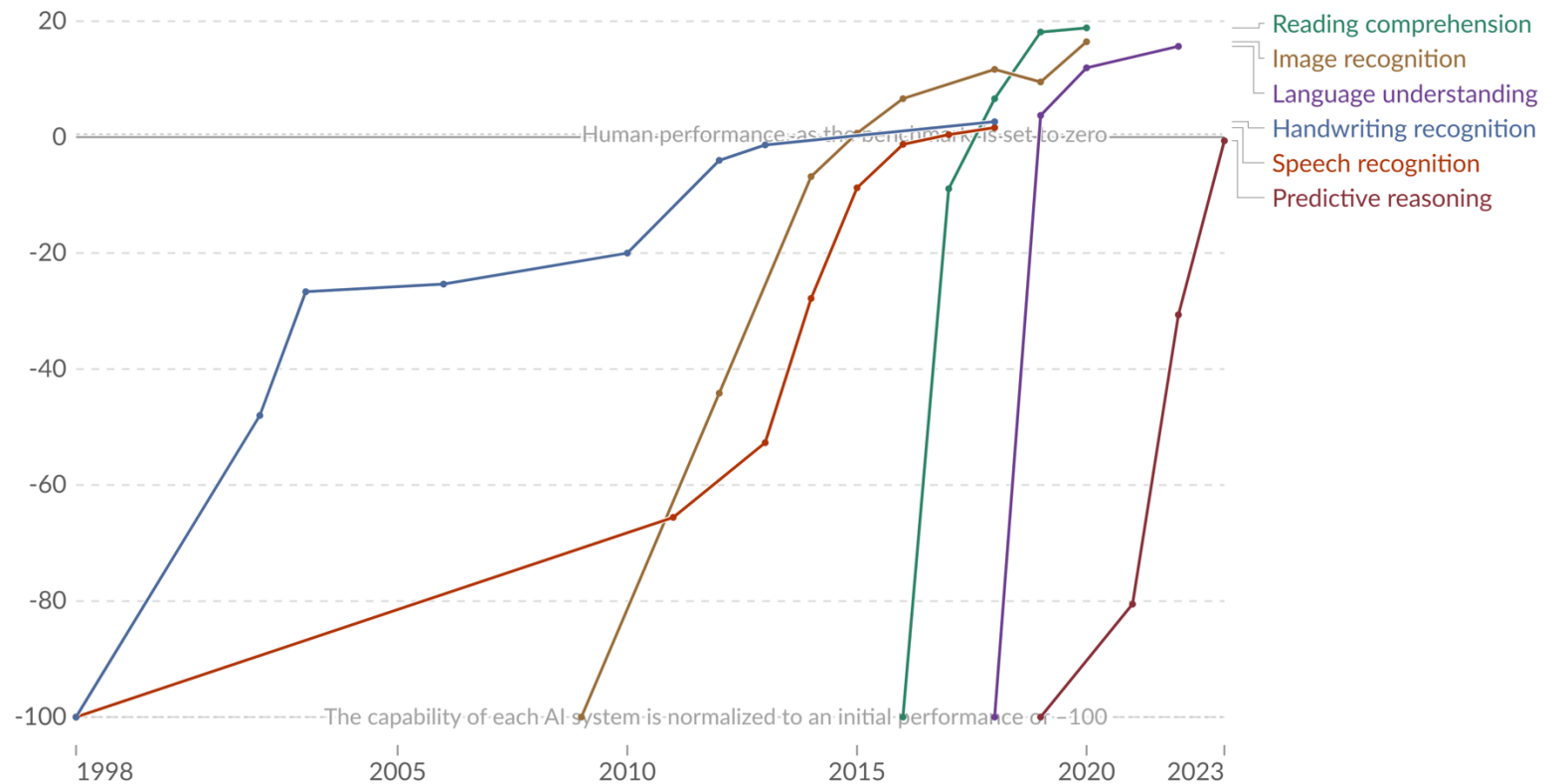
Building blocks of AI

- Data
- Algorithms
- Computing power

Test scores of AI systems on various capabilities relative to human performance

Our World
in Data

Within each domain, the initial performance of the AI is set to -100. Human performance is used as a baseline, set to zero. When the AI's performance crosses the zero line, it scored more points than humans.

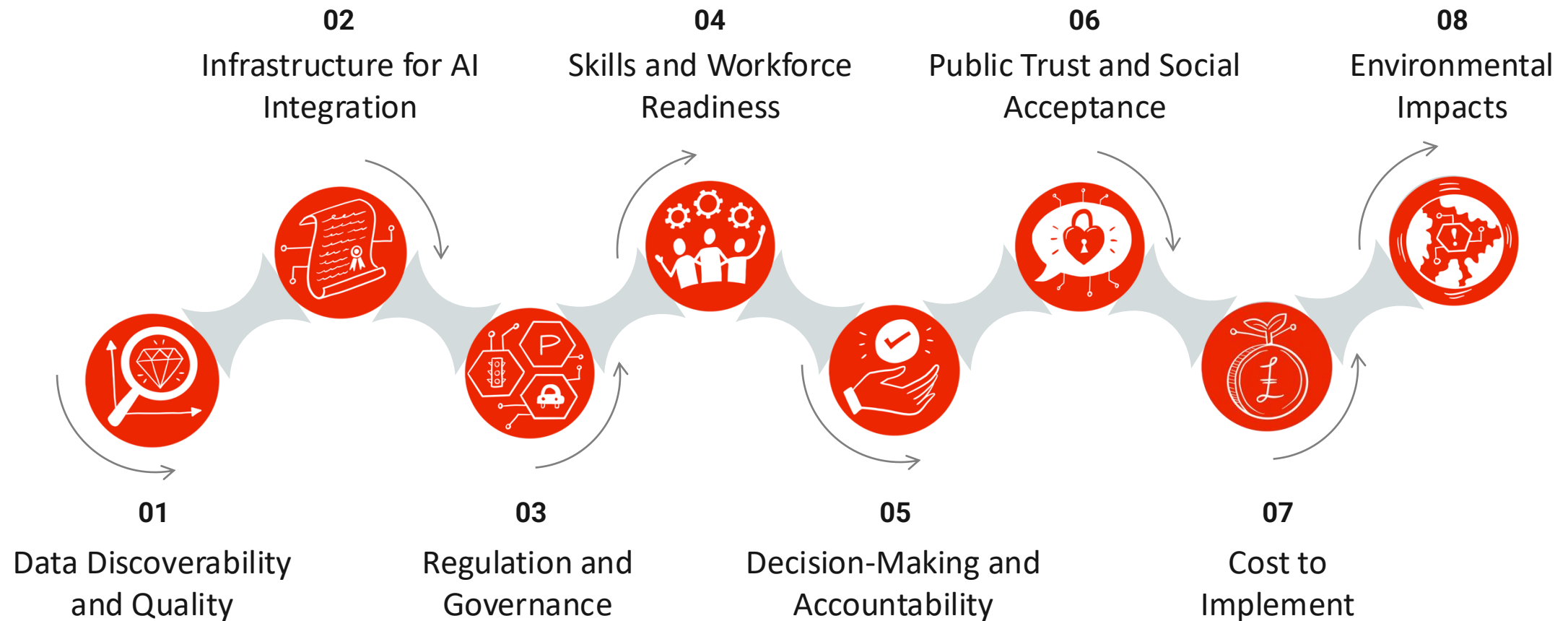


Data source: Kiela et al. (2023)

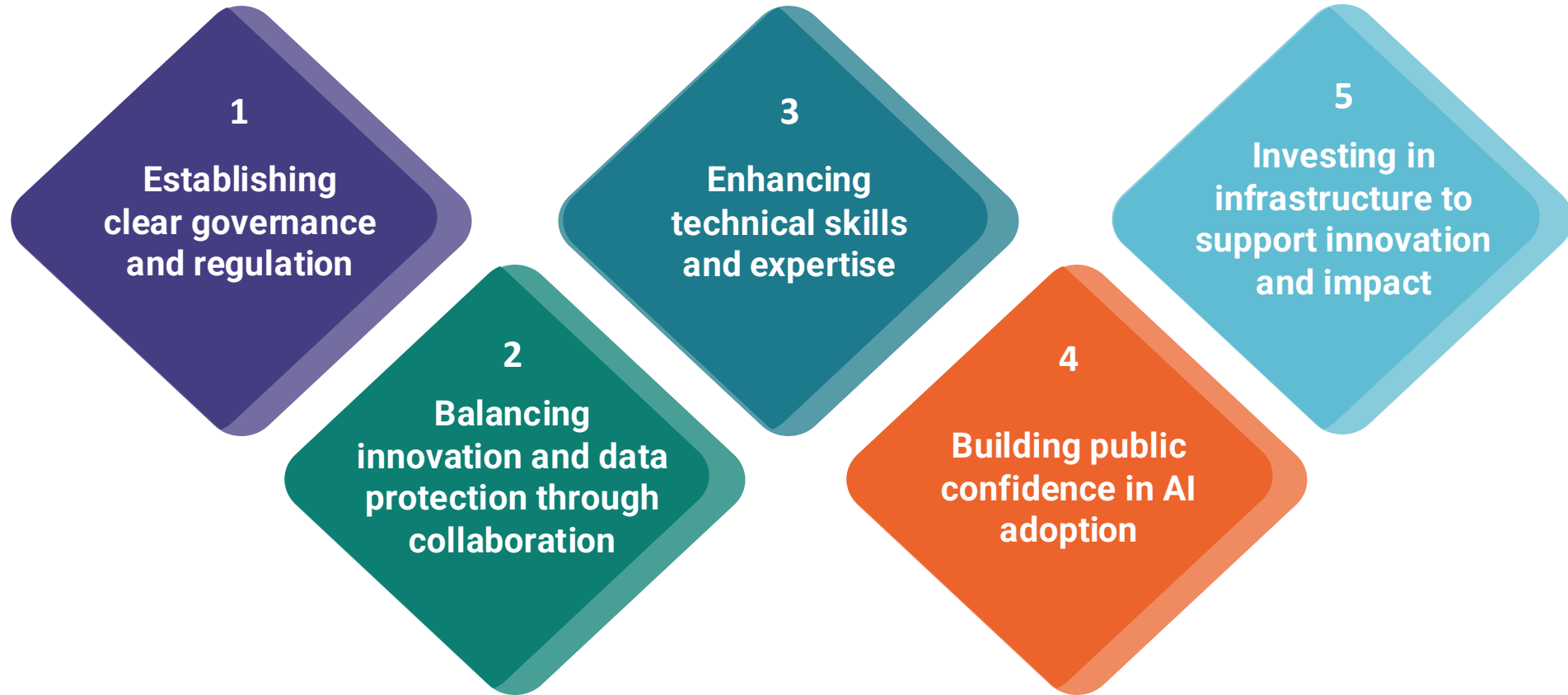
OurWorldinData.org/artificial-intelligence | CC BY

Note: For each capability, the first year always shows a baseline of -100, even if better performance was recorded later that year.

Overcoming the **Barriers** to AI Adoption in Transport



Five key **opportunities** to transform transport as we know it



What we have achieved so far:



Governance

Established AI Project Oversight Group for assurance of AI applications

Roll out of AI Commercial Guidance across wider DfT

Algorithmic Impact Assessment embedded into the existing Data Protection Impact Assessment

AI included in management assurance processes



Technical

Image recognition for counter fraud

Correspondence drafting

Automated consultation analysis

HR Chatbot

Digital led CoPilot trial

Bespoke AI builds



Research

Taking a behavioural science and human factors approach to driving adoption

Published Deliberative research

Collaboration with Alan Turing Institute and ONS to measure potential productivity gains which can be delivered by AI

Public Opinions on AI through the ONS Public Opinions and Social Trends Survey

Participation in the ONS public sector time use survey to identify opportunities for deployment of AI



Events and Partnerships

Strategic partnership with Alan Turing Institute and Google

AI Focused Data Science in transport conference

AI Hack Event in partnership with Google and PA consulting

Joint Data Science Working Group with DfT DVLA and DVSA to foster collaboration



Training

Learning needs analysis to support design of specialist training

Working with specialist consultants to develop and trial learning packages

Foundation course launched

Implementors half-day training workshop

Senior Leaders workshops to be launched summer 2025



TfL THE FUTURE OF TRANSPORT

PPR2060

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BRIDGING THE GAP

Overcoming the **Barriers** to AI Adoption in Transport



FROM THEORY TO PRACTICE

Methods Overview

This report follows a structured approach to identifying and analysing barriers to AI adoption in transport. It incorporates insights from academic literature with industry expertise gained through two interactive workshops. The first workshop confirmed and prioritised the barriers, while the second explored the barriers in more depth to identify potential solutions.

A growing body of literature focusing on the barriers to AI adoption across many sectors underscores the critical role that overcoming these barriers has in unlocking the benefits of AI. To establish a solid technical foundation for this work, scientific and grey literature were both reviewed, including research reports from non-academic publications, policy papers and industry white papers. Barriers to AI adoption were identified from this research and categorised into four key themes:

1. Technological barriers
2. Organisational barriers
3. Societal, economic and environmental barriers
4. Cross-sector collaboration

This workshop began with an interactive presentation summarising key findings from the literature review, which identified **12 preliminary barriers to AI adoption**. Participants were invited to engage with the findings through digital interaction tools, enabling them to prioritise barriers relevant to their specific domains. The group was then divided into two discussion panels, where they explored:

- How each barrier manifests in different transport sectors
- Examples of specific projects where these barriers had been encountered
- Prioritisation of barriers based on impact and feasibility of resolution

A key outcome was the finding that some of the initial barriers identified were found to overlap, and so these were merged to result in a condensed

list of eight barriers. The discussions provided real-time insights into industry perspectives, refined the AI adoption barriers and informed the focus of a second workshop. The second workshop took place at the Transport AI Conference in Manchester, where 65 experts attended from across the transport industry, including rail, road, maritime, aviation, and urban mobility. Stakeholders came from a diverse range of organisations, including public transport authorities, consultancies, research institutions, and AI solution providers. This allowed a broad scope of perspectives and expertise, enriching discussions on AI adoption challenges. Eight tables were formed to facilitate focused conversations on AI adoption challenges, with each table focused on one of the eight identified barriers.



DATA DISCOVERABILITY AND QUALITY

Definition: AI in transport faces challenges with using fragmented and often inaccessible data due to proprietary restrictions which creates a lack of standardisation. This limits access to reliable, fair and ethical data AI-driven data and applications.

Literature Review

Given the nature and sheer volume and heterogeneity of data generated within the transport ecosystem, data encompasses diverse formats. Across formats, including real-time and historical data, multifaceted, from sensor readings and traffic flow data to passenger information and maintenance logs. As highlighted by the UK Government Digital Service report, this fragmented data landscape makes it difficult to identify and access the specific datasets needed for particular AI applications. Transport data often resides in multiple public and private databases (e.g., bus operators, transport companies, local authorities). Gaining a consolidated dataset is difficult, particularly when commercial interests or privacy concerns limit data sharing. Thus, emphasis is placed on the need for standardised data formats and common data platforms to facilitate data sharing and interoperability across different stakeholders. Research has shown that the lack of standardised data governance frameworks and metadata schemes hinders the discoverability of relevant datasets. This lack of discoverability translates to increased time and resources spent on data acquisition and preprocessing, significantly slowing down the AI development lifecycle.



Root Causes

- Lack of centralised data management making it difficult to locate, access, and integrate data for AI applications.
- Incomplete, outdated, or inaccurate data leads to poor data quality and undermines the reliability of AI models.
- An unbalanced number of uniform data formats and metadata are challenges that limit the scalability of AI solutions.

Case Study

Traffic Regulation Orders (TROs)

Despite its potential, countries with rigid safety regulations as this is enforced within. Currently, deploy authorities across regulations and vary in format to anticipate and improve our road network across data (particular providing real-time closures remain optimisation for causing delivery consumption).

In other words, that can benefit currently suffer data sharing in smaller cities for centralised in-house capabilities. Without such an impact, real-time operators can't routes, leading

OPPORTUNITY 3

Enhancing skills and technical expertise

Workforce culture, leadership, and technical skills limit the adoption of AI in transport. These challenges were raised in discussions on Skills and Workforce Readiness, Decision-Making and Accountability, and Public Trust and Social Acceptance.



A proactive learning culture, leadership engagement, and workforce training must be encouraged to embed AI skills across the public and private sector. **A national AI skills strategy should be introduced**, and local delivery mechanisms put in place, to ensure the UK workforce – from senior leaders to frontline workers – have the knowledge and confidence to work with AI-driven systems. To bridge technical skill gaps, **collaboration with industry, academia, and training providers** to share technical data analysis skills, AI literacy, and ethical AI considerations will enable employees to work alongside AI systems effectively rather than viewing them as a threat.

Strong leadership is crucial for AI adoption. **Promoting AI literacy at the executive level** must be considered to ensure senior leaders understand the potential, risks, and implementation strategies for AI. A lack of leadership engagement often results in slow decision-making, risk-averse behaviour, and missed opportunities for AI-driven innovation. Fostering a supportive work culture and promoting AI adoption through transparency, employee engagement, and reskilling opportunities will strengthen acceptance. Employees need to see AI as a tool that enhances their work rather than replaces it. **The early implementation of good change management practices**, such as open communication, clear role transitions and training, will ease resistance and create a workforce that embraces AI as an enabler of progress.

1

Stakeholders emphasised how using "all" data available to enable AI-driven innovations is challenged with concerns over data privacy, ownership, and competition. It became apparent these sensitivities create resistance to sharing data across stakeholders. **Reducing the creation of unified and interoperable AI systems** that could enhance transport services.



2

AI is a broad subject area that requires clear and rigid governance. At present, the lack of collaboration and coherence hinders decision-makers from leveraging their understanding to provide solutions faster.



3

Existing tension surrounding data usage, particularly regarding commercial sensitivity is driven by a lack of harmonised regulations across different governance levels.



4

Progress to integrate AI is hindered by structural governance gaps and what levels of passenger



5

Priority roadmaps and consistent forms of communication will provide stakeholders with the mechanisms and tools needed to share data between private and public organisations, offering more flexible and adaptable regulatory frameworks.



6

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