Three new imperatives for the UK rail industry

The challenges facing rail, train and station operators today – and how to start tackling them

Virgin media O2 Business

Building back better in the UK rail industry

In the aftermath of the COVID-19 pandemic, the UK rail industry is facing new and unforeseen challenges, as well as some significant opportunities. The challenges are many and varied, but this paper focuses on three ways that UK rail, train and station operators can start to build back better:

1. Evolving the passenger experience:

Rail companies are under pressure to return to pre-pandemic levels of revenue. The mass commute to work is likely not coming back, so operators must identify new ways to encourage people to take the train. That will mean understanding what passengers seek from a travel experience, and adapting services to meet new patterns of demand.

2. Re-imagining station facilities:

Changing patterns of railway use are creating intriguing opportunities to re-imagine the purpose and function of stations. As people spend more time in the towns that used to be dormitory suburbs for city commuters, is there a new or expanded role for smaller stations within the community? And what about city-centre stations in the post-commute world?

3. Optimising maintenance and repair:

Track maintenance and equipment failures are a key factor in delays and service disruptions, undermining the passenger experience. How can Network Rail and TOCs make best use of emerging technologies to optimise maintenance and repair operations?

In this paper we'll explore these challenges and propose some practical approaches to tackling them, drawing on the capabilities of technologies like data, sensors, analytics and the internet of things (IoT).

Rail contributed just **1.7%** of total UK transport greenhouse gas emissions in 2019[2]

1

Evolving the passenger experience

Before the pandemic, the UK's rail services were largely organised around commuter travel, which accounted for nearly half (47%) of all pre-pandemic journeys.[1] Now, the shift to dynamic, remote and hybrid working means commuter journeys are highly unlikely to return to their previous volumes.

But that doesn't have to mean a decline in demand for rail; far from it. As one of the least carbon-intensive modes of travel, the train has a pivotal role to play in the UK's transition to a net zero economy. And with the rail network able to deliver passengers directly into town and city centres, it offers many advantages over car-based and air-based travel.

1-2. Rail factsheet 2021

Understand changing demand for rail services

The key for train and station operators is to understand the evolving travel needs of UK residents and visitors, and deliver a passenger experience that makes rail travel preferable to other modes.

Increasingly, that means understanding how rail travel can fit more easily into wider end-to-end journeys, as well as understanding what passengers want and expect from the train travel portion of their journey. Only then can rail operators evolve their services to offer a more appealing option than driving, air travel, or not travelling at all.

Transport for Wales taps into passenger mobility data

"There's a growing recognition that we need to be using travel demand data sources from mobile devices. It's more reliable than surveys, provides a much higher sample size and is easier to collect. O_2 data removes the guesswork and enables us to anticipate pressure on our rail network and plan ahead for potential fluctuations in demand."

Transport Analysis Manager, Transport for Wales

How we can help

O_2 Motion and Real-Time Location Insights uses aggregated, anonymised data on movement, profiles and preferences generated by 35% of the UK's population from billions of daily network events. It can be used to understand passenger movement between rail, road and air networks, to optimise and schedule services in line with changing demographic trends.

Optimise the on-train passenger experience

One of the most important aspects of post-pandemic revenue recovery is regaining (and increasing) consumer confidence to travel on the train.

While there are lingering hygiene and safety concerns following the pandemic, would-be rail travellers are also deterred by concerns including overcrowded trains, delays, journey planning complexity and an uncomfortable environment in comparison with a private car.

That makes the on-train passenger experience a key area for improvement, including taking measures to reduce overcrowding, minimise disruption, improve passenger communications before and during the journey, and cater to the needs of different types of passengers.

New technologies can help here – by monitoring crowd movement and behaviours, sensor-based technologies to detect and prevent overcrowding and equipment failures, and health and safety technologies to keep passengers and staff safe.

GWR trials enhanced passenger information services

In 2021, Network Rail and GWR trialled a new information service designed to provide passengers with more enhanced travel information about train services during delays and disruption. The service offered weather-report style video updates via social media to help passengers understand and plan around delays.

"This allows us to work even more closely with Network Rail to provide in-depth information about what is causing delays, what is being done to resolve them, and how customers can continue their journeys."

Barry Milson,
Performance Director, GWR[3]

How we can help

Smart Spaces uses video analytics and AI to monitor passenger and staff movement and behaviours in indoor or outdoor spaces including trains and stations. Use it to optimise the passenger and employee experience with anonymised insights into crowding, safety risks, passenger-staff interactions, antisocial behaviour, accessibility needs, and overall space utilisation.

Private Networks offer fast, seamless and guaranteed network connectivity to passengers, staff and automated equipment alike at stations – ensuring that network slowdowns, outages or coverage gaps are never an issue for rail users or employees.

Our IoT and PaaS solutions provide connectivity, a platform, sensors and data analytics to build bespoke sensor-based solutions that optimise the passenger experience. From crowding sensors to air quality monitoring, and from preventative maintenance to AR-based guidance for engineers and technicians, we can build solutions that help train operating companies meet their passenger experience goals.

Spatial Insights provides real-time insights into people movement and behaviour, to manage capacity in a safe way, and monitor dwell, occupancy and movement to determine where people are spending most of their time and how they move around stations. Spatial insights can also monitor real-time events, for example slips, trips and falls, risks and hazards and trespassing and access control in key areas of the station.

3. Network rail gwr trial new enhanced passenger information service

38%
of UK workers now work fully or partly from home (ONS)

2

Re-imagining station facilities

Almost two in five (38%) UK workers now work fully or partly from home, according to the Office for National Statistics, with only 46% travelling to a workplace every day.[4]

These radically changed work patterns mean more people are spending more time in their local area – not just working from home, but also walking, shopping, and meeting friends for coffee or lunch. That's opening up intriguing opportunities to re-think the role of stations within the community.

Once simply a place to buy a ticket and get on the train, the central location of many stations means they could play a much fuller and more diverse role – especially as the automation of traditional functions like ticket sales opens up new spaces within them.

4. Quarter workers hybrid official figures show

Understand how stations could be repurposed

Some large city-centre stations have become shopping and dining destinations in their own right, so could smaller stations follow suit, and even go further in terms of the services and facilities they provide to the community?

To answer that question, station operators need to understand in depth the changing population dynamics in the station catchment area. What kinds of people are moving to and out of the area, and what are their working and travel patterns? What kinds of services would they like to have access to, and how well are these needs currently met in the community?

These population insights can be married with an analysis of how the current station facilities are used by passengers, staff and other visitors, to identify under-utilised areas and spaces that could be repurposed. New, experimental uses of the space can then be trialled, and their usage monitored to understand uptake and utilisation.

Beccles station takes on new life as a community hub

In 2016 Beccles Station in Suffolk was refurbished and relaunched as a community hub by a local action group. The repurposed station now offers office space, a café, meeting rooms, cycle hire, and a yoga/dance studio. Profits are re-invested in community facilities.

"The refurbished station creates an attractive and functional gateway to Beccles that will be welcomed not only by visitors to Beccles, but by the whole community."

Christine Pinsent, Beccles Station Project

How we can help

O2 Motion uses aggregated, anonymised data on movement, profiles and preferences generated by 35% of the UK's population from billions of daily network events. Use it to understand demographics and activity in the wider station catchment area, to identify potential new uses for station facilities.

Smart Spaces uses video analytics and AI to monitor movement and behaviour in indoor or outdoor spaces such as stations, retail spaces or office suites. Use it to understand space utilisation in the station environment, with anonymised insights into popular and under-used areas as well as safety risks, customer-staff interactions, and accessibility needs.

5. Opening of Beccles Railway Station building

3

Optimising maintenance and repair

Service punctuality is a key factor in the passenger experience, yet in 2019/2020, around half of trains in northern England and one third of trains nationally were late.[6] Compounding the impact, 401,746 scheduled rail services were replaced by buses in 2020 alone – a 170% increase on 2010.[7]

Track maintenance and trackside equipment failures are a key contributor to these delays. While Network Rail has made great strides in improving maintenance, its most recent (2019) Challenge Statement for maintenance[8] acknowledged there was more work still to be done, noting that:

- Delays due to asset failure are increasing, despite the number of failures falling
- Track access required for maintenance does not align to train service specifications
- Condition monitoring data is not yet used for predictive/preventative maintenance

Buses replaced scheduled rail services **401,746** times in 2020 – a **170%** increase on 2010

6. GBR Williams Shapps plan for rail
7. Rail firms profit with 170 rise in replacement bus services
8. Challenge Statement Maintenance Enabling transition to predict and prevent maintenance reg

Accelerate the move to pre-emptive maintenance

A key objective for Network Rail is to accelerate the shift to predictive and preventative maintenance by deploying more sensors on tracks and trackside equipment and making smarter use of the data they generate. The Department for Transport advocates the use of digital twins for this purpose, with a view to reducing maintenance costs as well as delays.[9]

Similarly, increased use of sensors and digital twins can help to optimise train maintenance regimes and reduce the number of delays due to on-train equipment breakdowns.

How we can help

Our IoT and PaaS solutions offer a complete set of building blocks for predictive and preventative maintenance and repair solutions. Wide range of sensors allow factors like vibration, pressure, temperature, liquid levels and much more to be automatically monitored, while our connectivity solutions ensure sensor data can be gathered from any location. Cloud-based processing, analytics and dashboards turn sensor data into real-time predictive insight into conditions across the network.

Remote Expert can help speed up engineering fixes should a fault occur. By using a high-speed audio-visual link, with headphones and a dedicated eyepiece, technicians in the field can get an expert advising them remotely to resolve faults faster and provide a compliant and supporting audit trail.

9. GBR Williams Shapps plan for rail

Improve worker safety

Maintenance speed and efficiency must never come at the expense of safety, whether of engineers, rail users, railway staff or the general public. New technologies can help to keep everyone safe – from the augmented reality headset that allows technicians to be guided by experts, to wearable devices and apps that ensure lone and high-risk workers are supported wherever they are.

How we can help

Remote Expert uses a high-speed audio-visual link, with headphones and a dedicated eyepiece, to connect technicians in the field to experts who can assist with specific jobs. Skilled engineers can optimise their time by advising remotely, while field technicians resolve faults faster and more effectively ensuring there is an audit trail and compliance checks.

Smart Spaces uses video analytics and AI to monitor movement and behaviours in indoor or outdoor spaces including trains, stations and on tracks. Use it to monitor and tackle safety risks including threatening behaviours, trespass and unauthorised access, and environmental hazards.

Lone Worker provides the essential building blocks of solutions that keep people safe in high-risk or lone working environments. Micro-wearables, cameras, lanyards and SOS buttons, backed with monitoring solutions and a 24/7/365 support centre, ensure that help is always close at hand.

9. GBR Williams Shapps plan for rail

Talk to us about how we can help today

Profound changes are affecting the UK rail industry – and while there are many pressing challenges to be tackled, there are also exciting opportunities to start building towards a bright future.

Virgin Media O_2 Business offers a wide range of enabling technologies and deep experience of developing future-proof solutions for leading operators including Transport for London, Network Rail and Transport for Wales. To discuss how we can help you address the challenges of today while building a digital foundation for tomorrow, please get in touch.

Talk to your account manager or call us on **0800 955 5590**

Business