

Speech: Let's raise our ambitions for a cleaner, greener railway

Good morning.

It's a pleasure to be here today (12 February 2018).

And where better to discuss the knowledge economy than the British Museum?

A place 'full of unassailable facts', according to Trollope.

And a fitting backdrop for this Knowledge Quarter conference.

Since this kind invitation was extended, I have moved from being Universities and Science Minister to being a Minister in the Department of Transport and Minister for London

And the invitation followed me.

In fact, it was clear to me that even as I entered the world of bus lanes, cycle-superhighways and high-speed trains, there was no leaving the knowledge economy.

Our hard infrastructure of roads, railways and airports and our soft infrastructure, in the form of our human capital and the institutions that cultivate it, are of course intimately connected and mutually dependent.

And one of the reasons for the Knowledge Quarter's success as a cluster is certainly its hyperconnectedness, so obvious in its extraordinary transport links.

St Pancras, gateway to continental Europe, now restored to its Victorian splendour.

King's Cross Station, transformed in recent years and now catering for 50 million passengers a year.

Euston about to be transformed by HS2, with faster connections to Birmingham, Manchester and Leeds.

Multiple bus routes.

Six different underground lines, as well as the Elizabeth Line and, eventually, Crossrail 2.

The Knowledge Quarter is networked – a quality that's vital for the transmission of knowledge into practical applications in our economy.

Transport and travel have always been fundamental to the development and diffusion of knowledge.

We can see that in the collection that surrounds us at the British Museum today...

With its countless stories of exploration, adventure and discovery.

And it's that relationship – between transport and knowledge – that I'd like to discuss today.

During the 19th century, Britain developed from an agricultural economy to an industrial one.

But today, our economic performance is increasingly dependent on our human capital.

Skills, creativity and innovation are more likely to provide a competitive advantage than access to mass labour or natural resources.

At the same time, the relationship between the state, business and citizens is changing.

It was Sir Francis Bacon who said 'Scientia potestas est' – knowledge is power.

Today, we all have unprecedented access to information and knowledge.

Tweets and videos go round the world in an afternoon – and sometimes old ones come back to bite too.

Higher education, once rationed to a narrow elite, is now a mass undertaking.

Whereas only 19% of young people went to university in 1990, the proportion is now close to 46% – and this includes more people from disadvantaged backgrounds than ever before.

Technology and political devolution are combining to rebalance power away from the centre – and towards the region, the community, and the individual.

This might sound like a threat to some.

But it's actually an opportunity.

It's an opportunity that's at the heart of the government's [Industrial Strategy](#).

In our support for hard and soft infrastructure – from HS2 to broadband to our universities and our world-leading science base.

In our creation of elected mayors and devolved authorities.

Building and supporting the knowledge economy across the Northern Powerhouse and Midlands Engine – areas that were global leaders when the industrial economy was thriving, and that are now diversifying into new sectors.

We want the rest of the country to be as hyperconnected as you are here in

London's Knowledge Quarter.

The new industries taking hold in these regions depend increasingly on innovation and specialist knowledge.

Sustainable energy and cyber security in Northern Ireland.

Manchester's media sector and science parks.

Digital hubs in Leeds and Newcastle.

And fast-growing creative industries in Wales.

But although new knowledge clusters depend on modern skills and innovation, something about them never changes.

Their reliance on good transport links and communications.

The Knowledge Quarter is itself actually part of a much bigger geographical network – sometimes known as the Golden Triangle – linking Oxford, Cambridge and London.

And containing one of the world's great science and innovation hubs.

Even within this extraordinary Golden Triangle, there is scope for better connectivity.

Which is why we're reviving the rail line between Oxford and Cambridge.

This route survived the Beeching cuts of the early 1960s, but was torn up a few years later by British Rail.

The closure of the line was one of the most regrettable acts of transport vandalism of the era.

Today, the corridor from Oxford to Cambridge is one of the fastest-growing areas of the country.

It contains not only brilliant universities, but also a great concentration of science and technology employers.

But transport connections between Cambridge, Milton Keynes and Oxford are so poor they create a barrier between hubs of knowledge-based growth.

So we are restoring the old line.

And we aim to have it fully open by 2030.

By reconnecting the two university cities with rail services, and by linking up Milton Keynes, Bedford, Bicester and Bletchley in the Golden Triangle, we aim to create a knowledge corridor that will drive growth and jobs for generations to come.

To develop more of these hubs across the country, we're carrying out place-

based Science and Innovation audits.

To build new consortia and smart regional specialisations.

We also want to deepen connections between knowledge hubs across the UK.

From Scotland to Cornwall to Northern Ireland.

It's vital we stimulate the knowledge economy by improving transport throughout the country.

That's why we're working with Transport for the North on its important plans for [Northern Powerhouse Rail](#).

And it's why we're transforming connections between Yorkshire, Lancashire and the Midlands by building HS2, linking 8 of our 10 biggest cities.

The biggest investment in the country's railways since the Victorian era.

But there's a clear problem with hypermobility that we must also acknowledge.

We're travelling twice as much as we did in 1970.

We're driving more than ever before.

And flying more than ever.

Many thought transport would become less necessary as the Internet grew.

But in fact the opposite has happened.

And while this mobility spurs economic growth, there's a price to pay.

In congestion.

Overcrowded trains.

Pollution.

And carbon emissions.

In fact there comes a point when too much travel undermines its benefits.

When congestion clogs the network and pollution destroys our planet.

We're at that tipping point today.

Congestion plagues the Knowledge Quarter and every major city in the country.

The average speed of vehicles in the centre of London is now just 8 mph during the day.

Trollope would recognise these paltry speeds.

That's a slow trot for a horse. If it carries on declining, we'll before long

reach equine walking pace.

However, occasionally, an opportunity arises to make a breakthrough.

To invest in and roll out technologies that are true game-changers.

Providing completely new solutions to old problems.

And we have one of those opportunities today.

To rethink the way we plan and deliver transport services.

To end our reliance on fossil fuels.

With self-driving vehicles and smart infrastructure.

With digital communications that design transport services around the user.

Our opportunity – if we grasp it – is to make travel easier and more reliable.

To clean up transport emissions.

To diversify our transport industry into new markets, and stimulate knowledge-based growth in our economy.

All while continuing to enjoy the special advantages that good transport connections have always brought.

That's the challenge.

The pace of innovation in the automotive sector, with driverless vehicles about to change our lives in ways we are only now just grasping, is breathtaking.

So let me instead take rail as my example.

Here there has been less innovation.

Certainly – train services have grown at a remarkable rate since privatisation in the 1990s.

Particularly considering that our railway infrastructure was designed and built for a Victorian economy – not a 21st century one.

As a result we now have one of the most intensively used networks in Europe.

This government is injecting record levels of investment in the railway to help it cope with these pressures and to grow further.

But alongside increased funding, the industry also needs to modernise and to innovate.

Compared with other forms of transportation, progress has been palpably slow.

Yes, we've got real-time platform information.

Better train management allowing more services to run on existing tracks.

And big improvements in safety.

But the railways of today are ones that in many respects Trollope would again have no difficulty in recognising.

The pace of innovation needs to find a new gear.

Sometimes, those innovations can be relatively modest.

That's why in October we launched the 'First of a Kind' programme...

With Innovate UK and the Knowledge Transfer Network...

To speed up the delivery of new ideas and improvements to rail services.

Today I can announce that the [winning ideas from the programme's first £3.5 million competition](#) include:

A system to guide passengers to available seats when boarding.

Apps that will improve the travel experience for disabled passengers.

And programmes which will educate and inform long distance passengers about the sights they see from their window.

But other innovations have to be on a much bigger scale.

And that's why I am today announcing a new ambition.

I would like to see us take all diesel-only trains off the track by 2040.

If that seems like an ambitious goal – it should be and I make no apology for that.

After all, we're committed to ending sales of petrol and diesel cars by 2040.

If we can achieve that, then why can't the railway aspire to a similar objective?

Rail may be less carbon intensive than road transport.

That's why modal shift's so important.

Getting freight and passenger vehicles off the roads onto greener forms of transport.

But that does not absolve the rail industry from cleaning up its own act.

You may have seen stories recently about transport becoming the most polluting sector of our economy.

And the fact that rail emissions have actually increased in absolute terms.
Up 33% since 1990.

This cannot go on.

Now – we are making progress on modernising rolling stock.

For example, the much derided Pacers are going.

Along with other long-standing members of the fleet like Intercity 125s....

Old diesels being replaced by much cleaner trains featuring low carbon and NOx technology.

But we need to go further...

By decarbonising rail, we'll reduce pollutants and improve air quality, particularly in our semi-enclosed stations.

We will tackle this with the urgency it deserves by setting tough new environmental performance goals in each rail franchise which the train operators will have to meet.

Total electrification of our tracks is unlikely to be the only or most cost-effective way to secure these vital environmental benefits.

New bi-modes trains are a great bridging technology to other low emission futures.

Bi-mode trains fitted with modern diesels – which we started introducing last autumn on the Great Western line and on the East Coast Main Line in 2018 – are less polluting than the trains they replaced.

And as battery technologies improve we expect to see the diesel engines in bi-modes replaced altogether.

With batteries powering the train between the electrified sections of the network.

Or maybe in the future we could see those batteries and diesel engines replaced with hydrogen units?

Alternative-fuel trains powered entirely by hydrogen are a prize on the horizon.

I'd like to see hydrogen train trials on the UK railway as soon as possible.

Hydrogen offers an affordable – and potentially much cleaner – alternative to diesel.

And the technology has developed fast in recent years.

To the extent that Alstom is now testing a train which only emits steam and

condensed water – yet is capable of 140 km per hour and a range of up to 800 kilometres.

Which matches the performance of regular regional trains.

Rolls Royce is also looking at this technology

So the next generation of trains is just around the corner.

To speed our journey towards a zero-carbon railway, the government is investing record amounts in public R&D to improve our knowledge base.

Through the environmental performance goals we are setting in each rail franchise, we will hold the train operators to account for progress.

These include reducing energy consumption of trains, depots and many stations.

We have tasked Arriva – the operator of the Northern franchise – to deliver an electric/battery hybrid on the Windermere branch from 2021.

But the drive to decarbonise must come from all sectors of the industry.

So today I am calling on the railway to provide a vision for how it will decarbonise.

And I expect the industry to report back by the autumn.

I want to see a clear, long term strategy with consistent objectives and incentives.

I want to see options like lighter rolling stock and alternative sources of power considered and analysed.

I want barriers to innovation removed, so ideas can be brought to market more rapidly.

And I want to see the railway industry show a lead on this crucial issue.

With train operators, Network Rail, and the companies that supply them – all working together as one team.

So let me finish this speech on a positive note.

Despite the challenges I've outlined today, I hope I've also communicated my optimism about the prospects for the future of transport in this country.

The organisations here in the Knowledge Quarter have a role to play in developing technologies and know-how that will help Britain to enjoy an even bigger advantage from transport in the future:

Increased mobility for every part of the community – yet less congestion.

More intensive use of the infrastructure – and yet more comfortable travel.

Faster journeys – yet fewer transport emissions. These goals are within our grasp.

A knowledge economy more innovative than ever.

So let's raise our ambitions – and realise them.

Thank you.