



How can rail respond if it reaches its peak?

Changes in how passengers use the railway mean new challenges as the industry strives to balance investment, capacity and passenger demands. Can growth be sustained? **MATT LOVERING** studies the future of UK rail

Rail travel has grown strongly over the past 25 years, as benign external conditions and private sector innovation began a cycle of growth which has since been underpinned by a step change in public sector support for (and investment in) the industry.

Many in the industry anticipate that this level of growth will continue for the foreseeable future, and hundreds of billions of pounds of investment decisions have been based on the assumption that it will.

However, there are some signs that this growth is beginning to slow. This raises doubts over whether more than two decades of growth can be sustained, or whether a changing external climate and continued concerns about service quality and affordability mean the UK is approaching 'peak rail'. In a scenario where demand will now begin to fall again, the industry will need strong leadership to remain relevant in the face of greater competition from new technology.

Since the mid-1990s, rail travel in the UK has grown from around 29 billion passenger km in 1994 to an all-time high of around 66 billion passenger km in 2017 (see Figure 1). But in the past 18 months there has been a significant slowdown in the rate of growth, with passenger kilometres travelled only growing at around 1% in the past year.

Despite the recent slowdown, the consensus of the rail industry as a whole appears to be that this strong growth will continue, with a number of bodies within the industry explicitly predicting growth and/or taking steps to increase available rail capacity.

For example, the Rail Delivery Group has forecast that the national fleet of rolling stock will need to increase by between 40% and 85%

over the next 30 years, in order to meet the demand generated by an expected doubling of passenger numbers. And Network Rail has stated that it expects passenger numbers to increase by 40% by 2040.

In order to meet the expected increase in demand, the Government is actively investing in a number of schemes aimed at boosting capacity and expanding the UK's rail network, including major schemes such as HS2, Crossrail 1 and 2, East West Rail and Northern Powerhouse Rail (see Table 1).

Based on known route lengths, coupled with estimates based on proposed routes, it is estimated that these projects will increase the length of the national rail route by 1,200km (to around 17,000km - 10,563 miles). However, these will all be high-density routes, and are expected to add a disproportionate amount of additional passenger capacity to the network.

Based on current capacity utilisation of high-density parts of the UK rail network, and the anticipated increases in track capacity, it is estimated that these schemes will deliver a combined increase in total passenger capacity of around 20% (see Figure 2).

The demand models upon which these forecasts are based are typically calculated using the modelling framework set out in the *Passenger Demand Forecasting Handbook* (PDFH).

The PDFH methodology takes current 'base year' demand for rail travel and grows this based on macro-economic factors (such as GDP and employment forecasts) and on factors that reflect the degree of competition from other modes of transport (for example, the cost of car ownership relative to rail travel). These factors are translated into growth in rail demand using elasticities, which are multipliers that set the degree of rail demand growth expected >

Table 1: Major rail infrastructure schemes proposed by the Government

Scheme	Description	Status	Planned completion	Estimated Cost
HS2	High Speed 2 is a planned high-speed railway, connecting London to Manchester and Leeds via Birmingham	In construction	Phase 1 by 2026 Phase 2 by 2033	£56bn
Crossrail	Crossrail, also called the Elizabeth Line, is a railway stretching from Reading and Heathrow to Shenfield and Abbey Wood	Partly in operation	By 2020	£15bn
Crossrail 2	Crossrail 2 is a proposed railway in the South East of England, running north-south across London	Pending approval	By the 2030s	£30bn
East West Rail	EWR is a railway aimed at improving connectivity between East Anglia and Central, Southern and Western England	In construction	The Western Section is expected to be completed by 2025	£1.5bn
Northern Powerhouse Rail	NPR is a proposed network connecting the most important economic centres of the North	Pending approval	By the 2030s	£69bn

Source: Teneco Consulting.

“It may be better for the industry to focus on managing the decline of rail travel rather than investing for further growth, otherwise there is a risk that a substantial amount of investment could be wasted on infrastructure that will not be utilised fully.”

► for a given growth in each indicator. This approach suggests that economic growth and service improvements have driven the growth of the past 25 years - and will continue to do so in the future.

However, while these factors are important, it is also possible that a substantial proportion of the recent growth has been driven by the unlocking of latent demand that was previously suppressed by capacity limitations and poor passenger experience. Once this latent demand has been fully unlocked, growth will slow. Further growth will then need to be driven by increases in true underlying demand, rather than unlocking suppressed demand.

In this case, the current elasticities used to forecast rail demand are no longer accurate, and may overestimate future demand. Indeed, current demand forecasts already materially outstrip forecast population growth, suggesting that the average number of rail journeys per person per annum will need to increase from around 16 to 22 over the next 16 years.

THE RECENT SLOWING OF GROWTH

Figure 3(d) shows the year-on-year growth of total passenger kilometres over the past ten years. Growth has slowed materially over this period, from 7% per year in 2007 to 1% per year in 2017. If this trend continues, future growth will be materially less than that observed over the past 20 years.

To understand future growth opportunities, it is important to analyse the factors that have contributed to the surge in passenger volumes, and assess whether these are likely to continue.

Worryingly, there is a strong argument that the growth of the rail industry observed over the past 25 years can largely be attributed to a number of ‘one-off’ growth drivers that have unlocked pre-existing suppressed demand. The contribution of these factors has now been realised for the most part, meaning that they will no longer contribute to strong growth in the future.

To highlight this, three key examples of one-off changes have been identified that have driven material growth in the rail industry historically, but which will not apply in future: improvements in revenue and demand management; reduced competition from other

modes; and a significant improvement in passenger experience.

■ Better revenue and demand management

The introduction in the early 2000s of advance purchase rail tickets enabled train operating companies to manage their overall demand and improve utilisation during off-peak periods, by offering cheaper fares to passengers booking in advance.

As shown in Figure 3(c), early adoption was very strong, providing a significant contribution to growth to around 2011 - the estimated growth of advanced purchase tickets was 37% per annum over this period.

Such creation of a new market would be consistent with evidence of the success of low-cost carriers in aviation, who used price to stimulate a step change in demand for air travel from the late 1990s.

However, the rate of growth associated with this step change cannot be maintained indefinitely, and the resulting slowdown now appears to be happening in UK rail. Following strong initial growth as suppressed demand was unlocked, growth in advance purchase tickets has now slowed to around 8% per annum, leading to lower overall growth from 2011 onwards.

■ Reduced competition from other modes

Government policy on motoring and aviation has had a material impact on the demand for rail travel. As Figure 3(a) shows, the total distance flown by domestic passengers in the UK had been in steady decline from 2006, with the 2007-08 recession and the increase of domestic Air Passenger Duty (from £5 in 2000 to £12 in 2011) having a strong negative impact.

The shift away from air for domestic travel has enabled rail to pick up modal share as a cost-effective alternative for long-distance domestic travel. However, as the effects of the recession diminish, there is some indication that domestic air travelling is growing again, offering increasing competition to rail.

The total distance driven by cars between 2006 and 2013 also declined (see Figure 3(b)), allowing rail to pick up modal share of short- and middle-distance travel over this period. The recession

Figure 1: Historic use of the UK rail network (in terms of passenger km).

Data for 2017-18 is based on 3 quarters of data that have been annualised Source: Teneo Consulting.

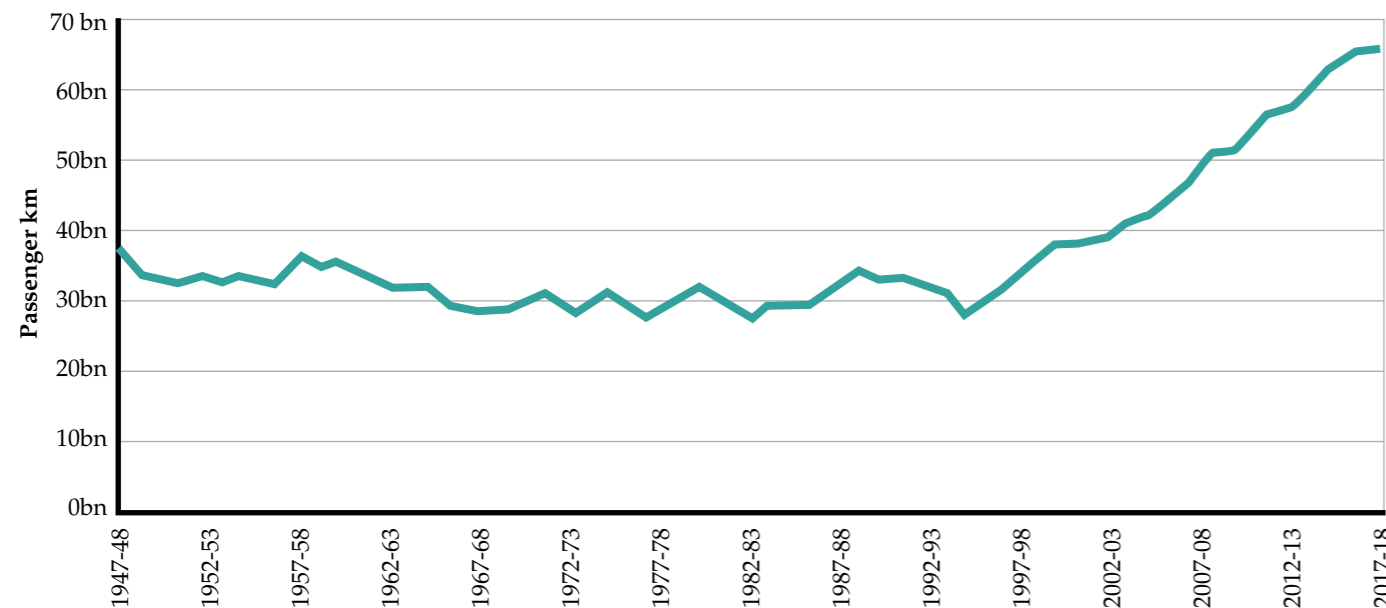
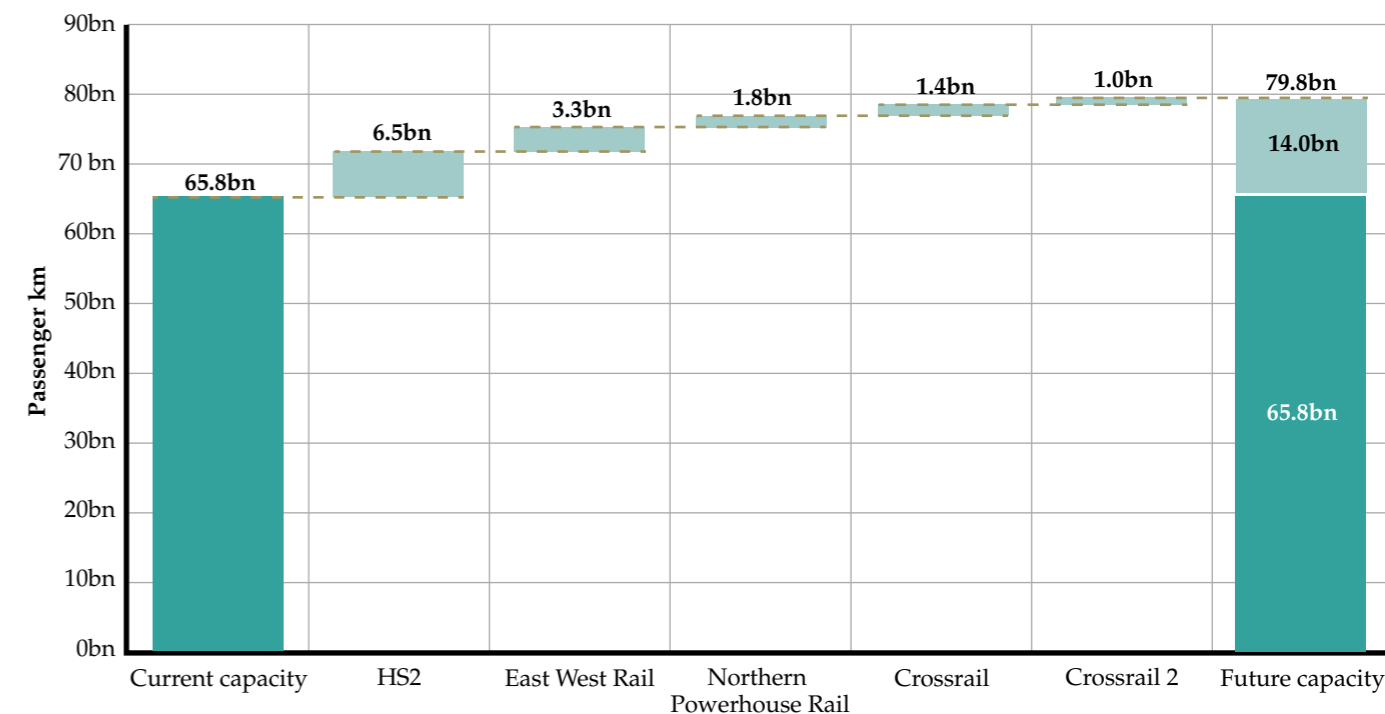


Figure 2: The estimated capacity increase (in terms of passenger km) that will be delivered by planned major rail infrastructure projects

Source: Teneo Consulting.



has again been a key driver of decline in car travel, although other factors have also contributed over this period:

■ Congestion charge prices per day in London have increased from £8 to £11.50 per day between 2006 and 2016, leading to more commuters travelling via alternative modes such as rail.

■ Petrol and diesel pump prices have been highly variable, but have broadly increased over this period.

■ A decrease in Advisory Fuel Rates - the total amount that can be reclaimed per mile travelled for business purposes - has made rail travel a more attractive option for business travellers.

It is noticeable that there has been a reversal in the policy trend over the past five years. Air Passenger Duty has been held constant

(and there is a new strong pressure to reduce it), while fuel duty on petrol and diesel has been frozen since 2011-12.

■ Significant improvements in passenger experience

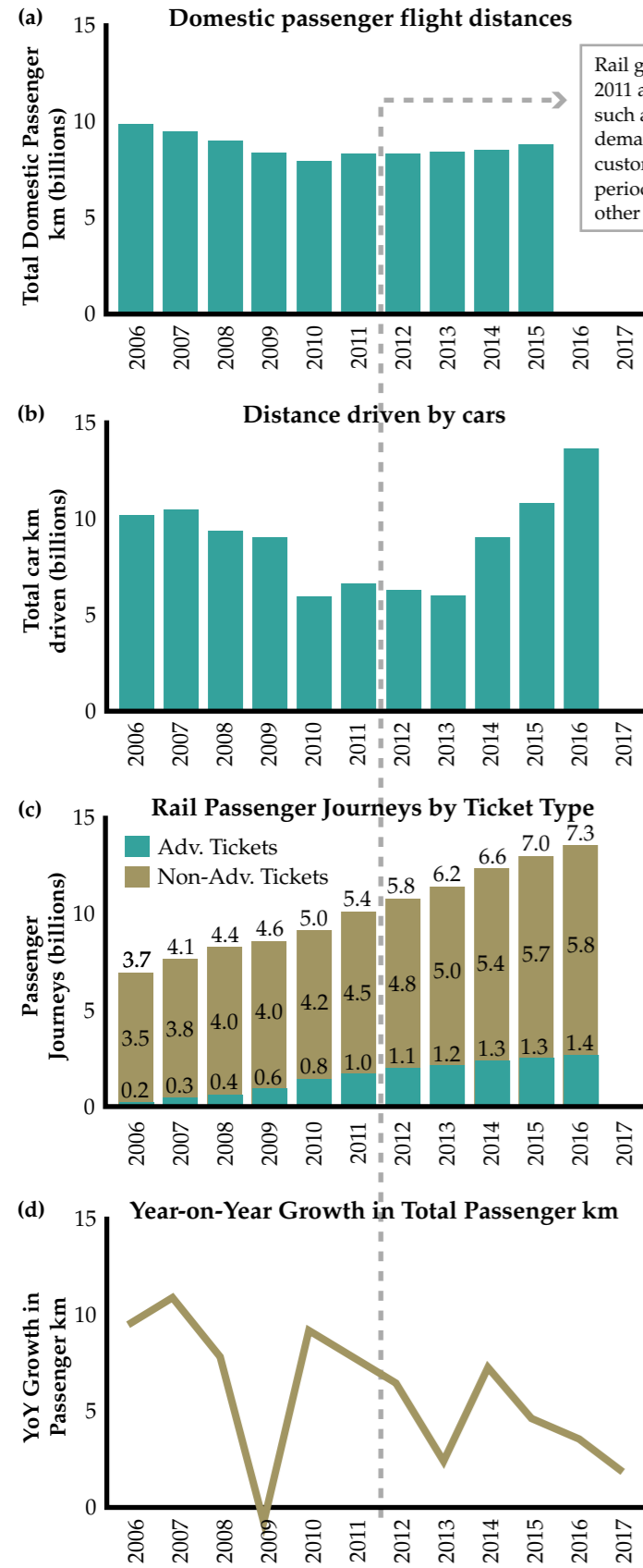
Passenger experience has improved materially over this period. Trains now offer features such as onboard WiFi and better mobile network signals, along with modern carriages that are fitted with utilities such as tables and plug sockets.

This improved experience has encouraged more passengers to choose to travel via train rather than alternative modes. It has also been supported by a technology revolution which has allowed working on a train to become a viable option for business ►



Figure 3: (a) Domestic air travel within the UK has decreased since 2006, but is starting to show some signs of growth. (b) Car travel has decreased since 2007, but has begun to grow again since 2013. (c) Sales of advance purchase tickets grew strongly since their introduction in the early 2000s, although growth has begun to slow. (d) The year-on-year growth rate of the rail industry (in terms of passenger kilometres) has slowed in recent years, as the effect of strong 'one-off' historic drivers on suppressed demand has declined.

Source: Teneo Consulting.



passengers. However, it appears that the effects of these improvements have now been fully captured, and further experience improvements are likely to be more evolutionary in nature and less demand-generative.

For example, current innovations focus on using data to create a more integrated travel experience for customers, and introducing measures such as smart ticketing and modal integration. While these are important initiatives that will deliver improvements to passenger journeys, they are unlikely to be as immediately noticeable and impactful to passenger experience as historic upgrades to rolling stock, while the step change in productivity enabled by technology has now also been fully captured.

As the benefits of these 'one-off' drivers have become fully realised, their impact on growth has reduced, leading to a slowdown in growth rate over the past five years.

It is unclear whether new step changes will emerge to support further growth in the demand for rail, but without them the rate of growth may slow considerably. Indeed, there are already some initial forecasts suggesting that it will slow - the latest High Level Output Specification (HLOS) for Control Period 6 suggests that demand growth across many key routes is likely to average less than 1% per annum to 2024 (see Table 2).

These forecasts still assume ongoing (albeit reduced) passenger growth. However, in addition to the decline of historic growth drivers, a number of societal trends may fundamentally change the nation's travel preferences and requirements in the short- to medium-term. If these trends continue, they are likely to further slow growth in demand, and could even lead to a reduction in demand for rail travel.

Shift in labour market attributes

At present, some 58% of rail journeys are employment-related (either commuting or business trips). However, in recent years, technology changes such as the internet and broadband have allowed more employees to work remotely, supported by an increasing acceptance of flexible working arrangements by employers.

This trend appears to have accelerated in recent years. As of 2014, the Office for National Statistics reports that 14% of the total working population (4.2 million people) were home workers (see Figure 4), with a far higher percentage of people working remotely for at least one day a week.

Recently, there has also been a significant rise in the number of people working in part-time or in non-traditional employment (such as 'the gig economy'), due to the popularity of services such as Uber and Deliveroo. These roles are typically more flexible in terms of working hours and location, and therefore do not have the same five day a week, peak-time commuting requirements as the traditional employment patterns that the rail industry was designed to serve.

Advances in other modes of transport

Electric vehicles are becoming increasingly commonplace, and sales of electric vehicles are likely to continue to grow - indeed, the Government has proposed a ban on sales of new conventional diesel and petrol cars from 2040. Additionally, the Government has recently guaranteed to extend the 'plug-in grant' to car dealerships until at least 2020, enabling potential car buyers to receive a subsidy of £4,500.

Electric cars are materially cheaper to run than normal cars. They require less maintenance; running costs are around 2.6p per mile, compared with 9.4p per mile for a normal car; and they are also emission-free (and with greater development of renewable electricity generation, they could become 'zero carbon', changing the environmental case for a modal shift to rail). Therefore, compared with a conventional car, the lower running cost of electric

cars makes them a more cost-effective transport option that can compete with rail.

While still a relatively nascent technology, self-driving vehicles could have a disruptive impact on the rail industry.

Compared with cars, one of the key benefits of rail travel (particularly for long distances) is that the time can be used productively by passengers. A report into travel time by Mott MacDonald suggests that 15% of people use train travel time productively for work, with many more using the time for leisure activities (for example, reading or watching films).

Self-driving vehicles would similarly allow car journey time to be used productively. They would also offer additional benefits compared with rail, such as door-to-door transport and ad hoc non-timetabled travel.

In the longer-term, travel technologies such as the 'Hyperloop' also have the potential to disrupt the rail industry. Hyperloops involve transport through sealed vacuum tubes, and could potentially reach speeds of up to 700mph, much faster than can be achieved through conventional rail. This would allow passengers to travel exponentially further distances in a shorter period of time, potentially making long-distance rail travel obsolete.

This technology is still very much in its infancy and requires significant development, but it has already received backing from companies such as SpaceX and Virgin's Hyperloop One, which has already constructed test and development tracks and plans to operate in Abu Dhabi by 2020.

In summary, rail demand forecasting is complex. Without detailed analysis, it is purely speculation as to the degree to which the recent slowdown is a short-term effect vs a persistent trend. Furthermore, there is clearly a natural variability and cyclical nature in the market that may have accentuated the recent slowdown.

However, there is strong supporting evidence to suggest that future demand may be lower than expected, and that growth will be materially lower than over the past 20 years.

IMPLICATIONS OF REDUCED GROWTH

If these societal trends continue, and growth in rail travel continues to slow, there is the possibility that the industry is approaching the point of 'peak rail', after which the use of rail travel in the UK will start to decline. If this is the case, then the industry must re-evaluate what its focus and priorities are for the medium term.

At present, the focus of the industry is very much on investing in infrastructure to create additional capacity for passengers.

For example, the Government is planning to invest some £170 billion on major schemes such as HS2 and Crossrail over the next 20 years. These schemes are primarily intended to add capacity - for example, HS2 would effectively double the total passenger capacity on routes between major cities in the north and south of England.

In addition to these major schemes, the UK Government's Statement of Funds Available (SoFA) for Network Rail in CP6 sets out plans to fund a further £7.7bn of smaller enhancement projects during the period 2019-24, many of which will create additional capacity.

In the context of 25 years of passenger growth causing challenges

"In a scenario of constrained public funding, the Government may realise more benefits by investing in connectivity rather than capital-intensive transport schemes."

relating to overcrowding, the rationale for this investment is clear. However, in a 'peak rail' scenario, is adding capacity meeting the correct market need?

It may be better for the industry to focus on managing the decline of rail travel rather than investing for further growth, otherwise there is a risk that a substantial amount of investment could be wasted on infrastructure that will not be utilised fully. Consequently, the industry as a whole - from the supply chain to the Government - should consider how it will deal with a softening of demand, and its approach to investment strategies and future funding.

It is also worth noting that the trends discussed above are likely to change the assumptions that underlie the business cases for many of the major schemes that the Government is proposing. These schemes are not expected to generate sufficient revenue to cover their cost. Instead, the economic case is based on the wider benefits to the economy that additional rail links will generate.

For example, an extract of the business case for HS2 is shown in Table 3. This shows that (net of the revenues HS2 is forecast to generate) the scheme will cost the Government around £40bn - direct revenues are only expected to cover 50% of the total costs, with the rest funded by the Government. This funding is justified by the transport and economic benefits that the scheme is expected to generate, which are expected to outweigh the Government's investment.

However, if growth is below the forecast assumed in this business case, or even declines, then the revenues generated by the scheme will be lower and the net cost to Government will increase. This will result in a reduction in the Benefit:Cost Ratio (BCR), which is a measure of the return on investment that the Government achieves, and a key metric for assessing the value for money of schemes. Indeed, in the latest update of its business case HS2 has already revised its BCR downwards by 0.5, due to a lowering of forecast demand.

Furthermore, 58% of current rail journeys are for business and commuting purposes. But if the trends in the labour market described above continue (an increase in the proportion of people regularly working from home or in flexible or non-traditional employment), fewer people will be commuting or travelling for business, and the proportion of leisure travellers will increase. When technology means that people are just as productive remotely as they are in person, then the economic value of face-to-face interaction falls... and the economic benefit of the transport that enables it declines.

Given the fact that future trends may mean that the BCRs of major infrastructure schemes will be lower than expected in the medium-term, the industry may even need to reconsider the need for some of these schemes.

Table 2: The DfT's 2017 HLOS for CP6 provides demand forecasts for a number of major passenger routes until 2023/24. These forecasts suggest that growth across all major routes is likely to be less than 1%

City	AM Peak			AM three-hour peak		
	Forecast demand in 2018/19	Forecast demand in 2023/24	CAGR	Forecast demand in 2018/19	Forecast demand in 2023/24	CAGR
Birmingham	21,800	22,300	0.5%	48,300	49,400	0.5%
Leeds	15,000	15,200	0.3%	31,800	32,700	0.6%
Manchester	16,200	16,500	0.4%	35,900	36,700	0.4%
London	321,700	336,200	0.9%	655,600	689,400	1.0%
Other Major Cities	17,400	18,000	0.7%	39,300	40,800	0.8%
Total	392,100	408,200	0.8%	810,900	849,000	0.9%

Source: Teneo Consulting.

Table 3: Extract of the business case for HS2. Values shown have been discounted to give a present value

Source: Teneo Consulting.

	Present Value, £bn (2015 prices)	Full HS2 Network
Capital Costs		55.8
Operating Costs		27.6
Total Costs		83.4
Revenues		43.6
(1) Net costs to Government		39.8
Net Transport Benefits		74.6
Wider Economic Impacts (WEIs)		17.6
(2) Total Net Benefit and WEIs		92.2
Benefit cost ratio (with WEIs) = (2)/(1)		2.3

► This is particularly true given the high level of investment required - the schemes set out in Table 1 alone are expected to require £170bn of investment. This investment may instead be better spent on schemes that support new ways of working and which capitalise on the societal trends currently under way, rather than running counter to them.

For example, the Government's Rural Development Programme is planning to invest a modest £3.5bn into rural economies by 2020, to support the improvement of broadband connectivity and allow for businesses to invest in new innovative technologies. The overall trend towards remote working, and improving connectivity and communications technology, means that (for business purposes at least) moving data is starting to replace the need for moving people.

In a scenario of constrained public funding, the Government may realise more benefits by investing in connectivity rather than capital-intensive transport schemes.

HOW MIGHT THE INDUSTRY RESPOND?

At present, the rail industry is focused on investing in infrastructure, equipment and skills to support exponential growth in future demand. However, while strong blanket growth across the industry now appears less likely, there will still be specific pockets of growth in demand, and the industry will need a more targeted solution to be able to address these.

Today, investment in the industry is largely driven by a small

number of 'mega-projects'. Tomorrow, projects will need to be smaller-scale, with strong business cases that address specific local needs.

For example, pressure on housing remains an ongoing problem throughout the UK, and in the South East in particular - and the Government is planning to build around 300,000 new homes per year to help solve this challenge. To accommodate new housing, existing communities will need to expand and new communities may need to be built - and both will require new transport connections in order to thrive.

An example of a project with the potential to address such needs in a targeted way is Crossrail 2.

The business case for Crossrail 2 suggests that it would be able to unlock 200,000 new homes across London and the South East, spur the regeneration of under-developed areas such as parts of Enfield and Haringey, and support 200,000 new jobs. The National Infrastructure Commission also suggests that Crossrail 2 should be a priority project that would relieve pressure on the London Underground and key Network Rail terminals, as London grows.

However, to successfully deliver the full benefits the scheme has the potential to deliver, Crossrail 2 must work in conjunction with local authorities and urban planners to ensure that planning policy aligns with the opportunities. The benefits rely on extensive development along its route, and so Crossrail 2 must work to ensure that the project reaches areas that are suitable for regeneration and high-density development. If not, there is a risk that Crossrail 2 will not deliver many of the benefits that it proposes.

Given Crossrail 2's potential for raising land and property prices along its route, and for stimulating local economies, there is also a case for ensuring that the private sector contributes appropriately to the opportunities that Crossrail 2 will create. Indeed, Craig McWilliam, vice-chairman of the Westminster Property Association, suggests that the private sector should help fund the scheme through supporting investment along the Crossrail 2 route, as well as through taxes and retained business rates.

"The right combination of value-capture models for [the development enabled by Crossrail 2], directly through taxes on development such as the Community Infrastructure Levy or indirectly through retained business rates, could secure the Government's requirement that London contributes half of Crossrail 2's cost. A growth promoting planning regime that creates and captures value will be needed," he says.

In addition, trends in employment mean that not only will

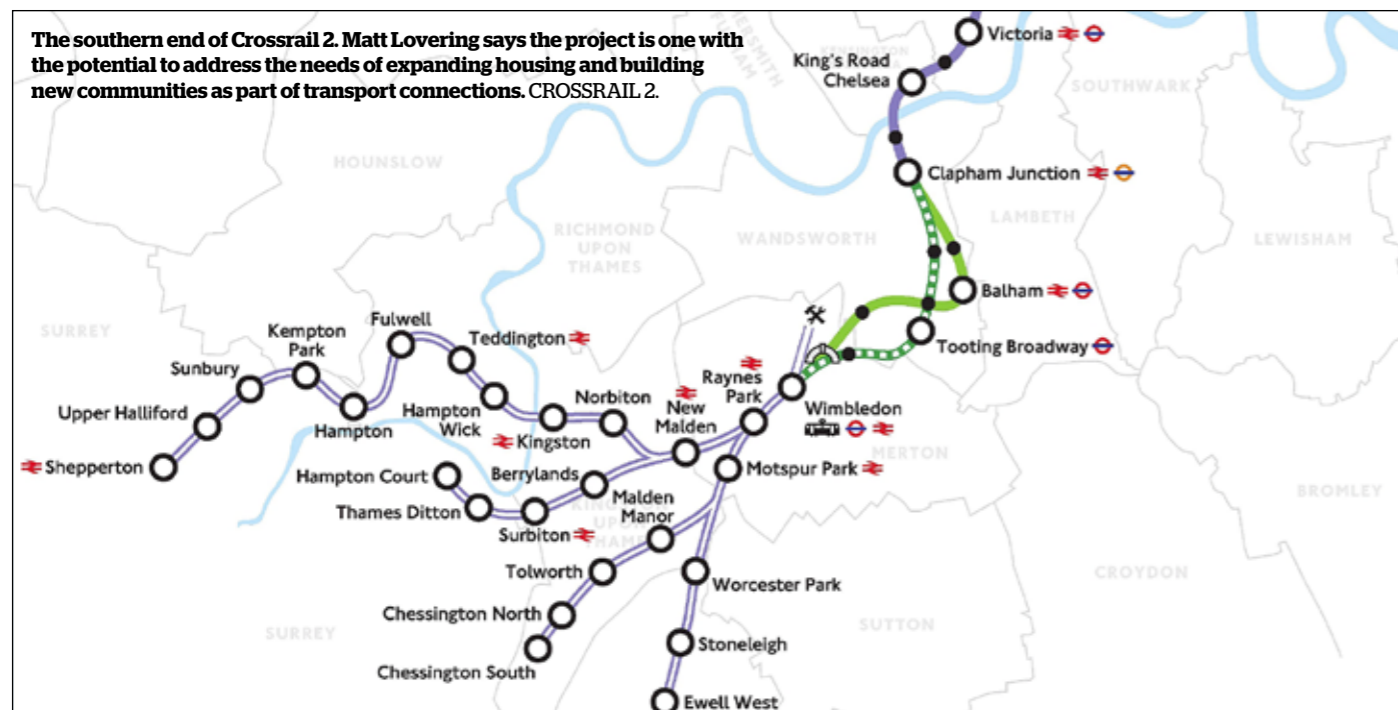
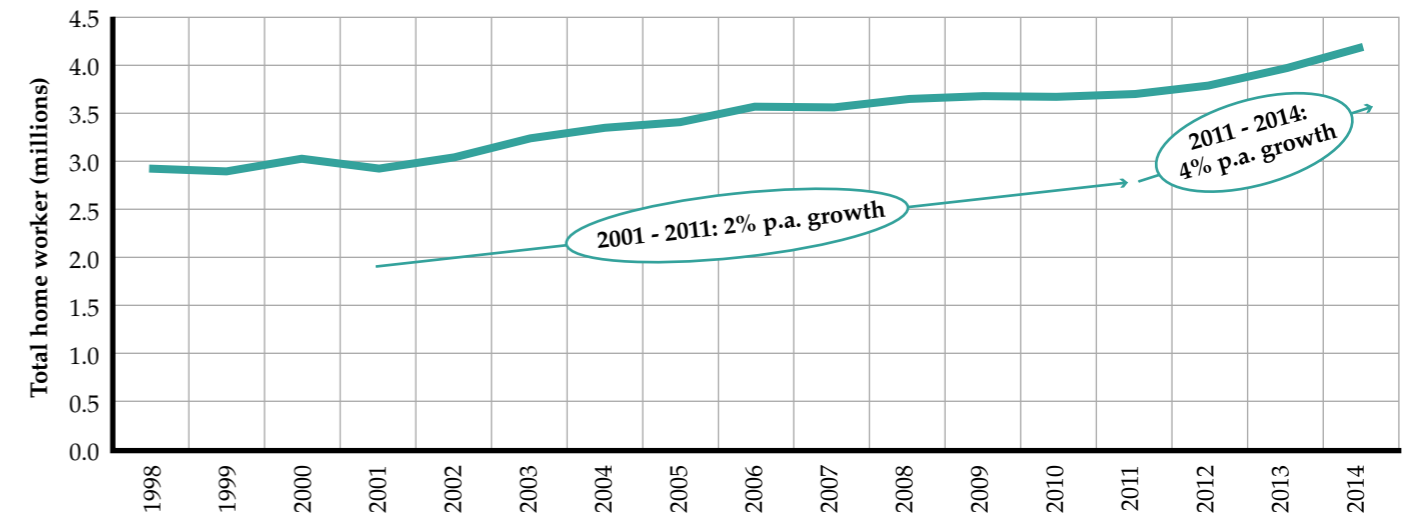


Figure 4: Total home workers in the UK (based on Q1 data for each year)

Source: Teneo Consulting.



demand slow or reduce, the shape of that demand is also likely to change in future.

At present, the UK has high-demand peak periods in the morning and evening, corresponding to commuters' journeys to and from work, with low-demand off-peak periods outside these hours. This large imbalance in demand drives inefficiencies, as the high asset and infrastructure requirements needed to ensure sufficient peak capacity means that asset utilisation is poor during low-demand off-peak periods. Indeed, the UK has some of the lowest overall train utilisation in Europe (see Figure 6).

However, trends in employment mean that workers are moving away from jobs involving a traditional '9-5' commute towards jobs with part-time or flexible hours, as well as the ability to work from home. Indeed, this trend is well under way - as of 2016, fewer than half of UK workers had a job involving a traditional commute.

This shift in employment practices offers opportunities for the rail industry to smooth demand between peak and off-peak periods, thereby driving efficiencies through better utilisation. However, in order to fully realise these benefits, the current approach to fares and ticketing needs to be re-examined.

The McNulty review has already identified that the existing fares structure does not send efficient pricing signals to the market, and struggles to effectively match demand to capacity. Given that employment and travel patterns look set to shift even further in the short- to medium-term, there is a requirement to introduce more innovative fare structures (for example, better use of peak, off-peak and super off-peak fares, or the introduction of Carnet tickets). The fares structure, and more importantly the way the Government regulates the fare structure, must evolve to meet this challenge.

In recent years, the rail industry has focused on adding capacity to the network, and has in places been prepared to compromise on passenger experience to achieve this goal. However, if demand slows, the focus of the rail industry must shift towards delivering an outstanding passenger experience, rather than continuing to focus on adding incremental capacity.

The rail industry is not only facing competition from other modes of transport (against which the industry is used to competing), it is now facing a new threat from existing passengers having the option

not to travel.

The rail industry must therefore use the quality of experience as a tool to encourage people to continue travelling. Consequently, investment should focus on delivering improvements in both the on-board experience (such as onboard entertainment, 'family friendly' compartments, and new or refurbished rolling stock), as well as service reliability and punctuality.

In many cases, this will shift the calculations underlying the business cases of proposed improvements.

For instance, several train operators have introduced passenger WiFi onto their trains. However, rolling out WiFi across an entire fleet can cost millions of pounds, and the economic benefits rely on increased ridership and ticket sales, rather than the sale of WiFi per se. Indeed, many operators have elected not to introduce WiFi onto their fleet, or have only done so because it is a condition of their franchise agreement, rather than because the economic benefits are material.

But in a world of falling demand and transformed customer choice, the industry must change its model. It must focus not on the incremental revenue that installing WiFi could generate, but rather on the risk to existing revenue from not maintaining the productivity advantage which has helped the rail industry attract new customers over the past 20 years.

Rail can remain highly relevant as a mode of transport going forwards, can continue to grow, and can even access new opportunities based on changing travel patterns. However, to do so, it must target its resources on clear pockets of demand, and ensure that it provides a high-quality service that aligns with modern passenger expectations.

This requires an acknowledgement of the new passenger landscape, and a commensurate shift in thinking across the industry: **■ Business cases must be built assuming flat or modest growth in demand, and must be evaluated against the potential decline in demand for travel in a 'do-nothing' scenario.**

■ The industry must consider future changes in travel preference now, to ensure that the long lead times for delivering some schemes are factored in.

■ The industry must challenge itself to bring innovative, new ideas to the market, which the regulator must be prepared to consider.

GETTING TO A NEW INDUSTRY

While there are clear opportunities for the rail industry to remain a relevant mode of transport in a changing travel landscape, radical change will be required to achieve this. The rail industry must overcome a number of key challenges to be able to successfully position itself for the future. The scale of these challenges is industry-wide, across government and the supply chain.

■ Supply chain economics

The rail industry supply chain comprises a diverse range of companies, from TOCs to construction and infrastructure ►

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► services providers. One of the key challenges for the industry is the current structure of this supply chain.

Many companies within the supply chain have effectively bid for franchises or contracts at low margins, requiring revenue growth to make the economics of these contracts sustainable over their lifetimes.

In particular, the current franchise model places a significant revenue risk on TOCs. At present, TOCs take part in a competitive bidding process to win the franchise. While the franchises are not awarded solely on price, it forms a significant component of the overall assessment and has led TOCs to bid aggressively, underpinned by an assumption of strong revenue growth. Recent franchises have entailed some very ambitious bids from the winning bidder, effectively predicated on significant revenue growth to ensure the franchise remains financially sustainable in the future.

This competitive nature of the franchise competition has helped create an environment where TOCs are operating on low margins (average profit margin for TOCs is 2.1% in the UK). This margin is based on an assumption of a low capital requirement and relatively low risks.

However, TOCs also typically have a relatively high proportion of their cost bases fixed, due to their fixed franchise payments to Government, committed track access charges to Network Rail, and long rolling stock leases.

This leaves the supply chain highly exposed to any slowdown or decline in demand. Low margins mean that any decline in revenue quickly places profits under pressure, while the high proportion of fixed costs means that the cost base cannot easily be flexed to compensate for a fall in revenue.

The Campaign for Better Transport report, *Ensuring a Sustainable Rail Industry*, highlighted the risks inherent in this model if revenue did not continue to grow, and that in many cases owning groups had based recent bids on a rapid acceleration in bids.

Since that report was published nine months ago, evidence from the industry suggests that these risks are beginning to materialise and threaten significant contagion across many owning groups. The challenges experienced by the East Coast franchise have been the most immediate and newsworthy, but they are unlikely to be a one-off. Indeed, a recent report in the *Sunday Times* suggests that there are another four franchises in financial difficulties, and which could become unviable before the end of the year.

These difficulties are not just restricted to TOCs - they also exist

“The Government must send clear signals to the supply chain about its future intentions - and then, crucially, stick to its decisions and not revise them at a future date.”

in other parts of the supply chain. One example is Carillion, which held a number of contracts with Network Rail.

Carillion’s business model relied on generating profits from high-value but low-margin contracts. As liabilities mounted, the company was forced to keep winning more contracts to bring in new revenue to cover existing liabilities.

However, Carillion’s requirement to constantly win new work meant that it was forced to tender contracts at extremely low margins, in order to win the large volume of contracts required. When a number of these contracts underperformed against Carillion’s expectations, this led to losses that ultimately caused the company’s insolvency. While Carillion’s collapse was not explicitly linked to its rail contracts, this is a topical example of the challenges presented by this model.

If demand for rail travel continues to slow or decline, more companies are expected to be in this position. Indeed, the Rail Delivery Group partly acknowledges the challenges of accurately forecasting demand, and the importance of accurate forecasting to the industry.

In its *Long Term Passenger Rolling Stock Strategy for the Rail Industry* (6th Edition), the RDG states: “Absence of granularity in demand forecasting creates challenges in terms of long-term forecast construction as well as understanding of short-term perturbations. With annual industry revenue now approaching £10bn, minor percentage perturbations in demand mean significant revenue variation for TOCs.”

The Government has begun recognising the challenges that this uncertainty brings by reducing the risk associated with franchises. On recent franchise bids, the Government has introduced a downside support mechanism that allows for a reduction in franchise payments in the event of particular scenarios - for example, an economic downturn.

However, given the challenges facing the industry, there is a need

Figure 5: Decline in total mass carried by rail freight

Source: Teneo Consulting.

Case study – rail freight industry

UK rail freight is an example of how the rail industry can be significantly disrupted by external trends. Historically, the key driver of rail freight in the UK was the transport of coal to fuel coal-fired power stations. However, the government’s policy to phase out coal-fired electricity in favour of renewable power has seen rail freight decrease by 30% from 2012 to 2016 as coal consumption has fallen.

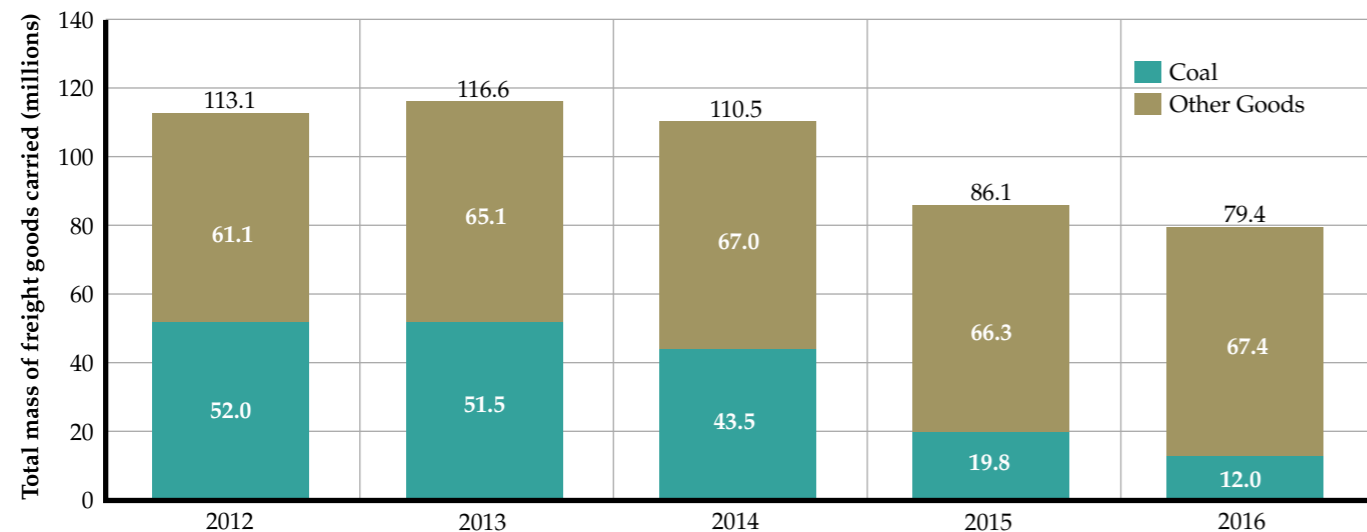
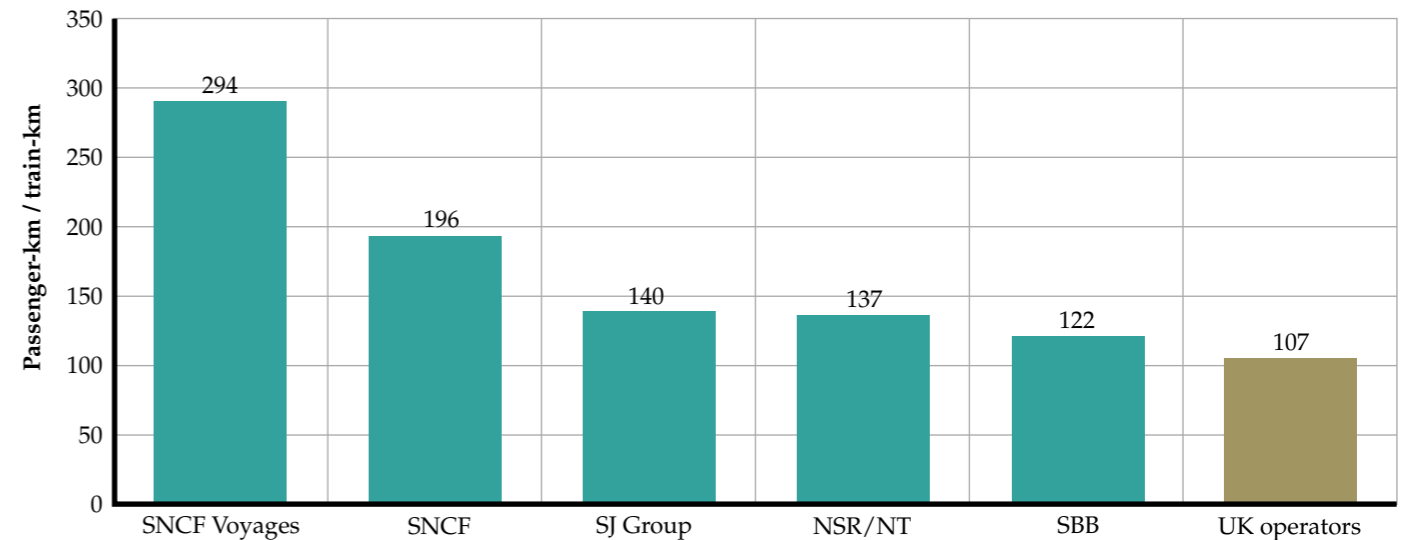


Figure 6: Fleet utilisation rates of example European train operators (from the McNulty report *Realising the Potential of GB Rail*)

Source: Teneo Consulting.



to develop and extend these mechanisms further, in a way that allows the industry to be agile and collaborative and to respond to a changing marketplace.

Supply chain investment

Ensuring that the supply chain is investing appropriately for the future represents a key risk for the medium-term.

The supply chain is currently investing heavily in skills, equipment and assets to support the expected growth of the industry, and the infrastructure and capacity increases being put in place to support this. However, if these infrastructure schemes do not take place, there is likely to be a significant amount of latent capacity in the industry in five to ten years’ time that is not required, and the

corresponding investment made by the supply chain will effectively have to be written off.

Conversely, there is a danger that the supply chain will question whether to invest in future capacity if it believes that the Government will not follow through on some of these capacity enhancement schemes.

For example, construction still has not commenced on a number of schemes, including major ones such as Crossrail 2 and Northern Powerhouse Rail, and there is therefore still a risk that any commitment to these schemes can be reversed. This could pose challenges if the Government then commits to these schemes at a later time. If the Government does not clearly signal its intention for these projects and make firm commitments, the supply chain may not make the ►



Carillion carries out work on electrification of Scotland’s Whifflet Line. Carillion’s collapse last year is indicative of the type of problems encountered by bidding for contracts at low margins, requiring revenue growth that does not materialise. CARILLION.

► required investments now to support these schemes in future. Further, as described above, if current low growth rates persist, many parts of the supply chain are likely to experience significant financial headwinds over the short-term. This may reduce their propensity to invest, by increasing the risk profile of investing in uncertain medium-term returns. And in some instances, it may even limit their ability to invest.

In order to overcome these challenges, the Government must send clear signals to the supply chain about its future intentions - and then, crucially, stick to its decisions and not revise them at a future date.

■ Challenges for the Government

The Government is now effectively committed to delivering a number of the longer lead-time schemes to increase capacity on the railway (such as HS2), but many smaller-capacity schemes have yet to commence. It should therefore use this opportunity to review its stance on the extent to which capacity improvements are needed on the network, and whether the proposed enhancements meet the challenges of a potential peak rail scenario.

A number of schemes will deliver additional capacity on areas of the network which are either already capacity-constrained or highly likely to be in the medium-term. But in a low-growth scenario, some schemes may no longer be necessary. In a low-growth scenario, the industry must instead focus on delivering quality over capacity to ensure that it continues to remain relevant, and does not put existing revenue at risk.

Furthermore, if the industry continues to invest in schemes without reconsidering the future need for them, there is a danger that once these projects are delivered they are underutilised. Considering the high investment required to deliver these schemes in the first place, this may result in the industry losing the public's

confidence, and effectively losing the right to receive future public funding.

This is particularly true in areas where passengers already have deeply held frustrations about the current quality of the service and historic lack of investment. Investing in underutilised capacity schemes while failing to invest in improvements to service quality will only damage public sentiment further.

However, if the Government decides that ongoing investment in building up the network infrastructure is appropriate, it must recognise that its supply chain is likely to face strong financial headwinds over the coming years, and thus will need support and a clear indication of the Government's intent for the industry.

Given the long lead times associated with many of these changes, to tackle the challenges facing the industry the Government must adopt an agile and flexible approach that recognises and responds to the problems of tomorrow, rather than the problems of today and yesterday.

It must also take leadership of the financial restructuring of the industry, as the scale of the changes facing the industry are over and above the level of risk that the private sector can sustain. ■

About the author

Matt Lovering is a Senior Managing Director at Teneo Consulting, and leads the company's consulting work in the transportation sector. He has over 20 years' experience providing strategic and commercial advice to public and private sector clients across the transport industry, and is recognised as one of the leading experts on revenue growth, commercial strategy and contract structures in the UK rail industry.



Matt Lovering, from Teneo Consulting, wrote a great article that raised some good questions about the future demand for rail in the UK. His piece calls on a lot of data and its timeliness is reinforced by the recent collapse of the East Coast franchise, which has been linked to a fall in passenger numbers, and the similar challenges rumoured or reported to be facing TransPennine and Greater Anglia, which have also suffered declining or stagnating passenger numbers. There is certainly a debate to be had about what should be done, but I'm not sure that we could say we are investing too much.

Much of rail infrastructure is old and has to be maintained, and investment is needed to upgrade and replace worn out assets. Passenger numbers may have fallen but the system is still overcrowded on many routes and the railway is critical to the economy, especially around London, and seen as a key enabler to growth in the regions. Matt recognises a number of schemes are likely to have a strong business case for growth; he cites Crossrail 2 as one, and there are many others. The problem is that we don't fully understand what is happening with passenger numbers, yet the lead-time for investment is long and this means that any decisions we make now will have consequences far into the future. The risk is building railways that may not be used or failing to provide the infrastructure our economy desperately needs.

Autonomous vehicles will dramatically change travel and Highways England is considering what this means for roads. They will certainly impact rail also. Hyperloop offers a great opportunity to transform long-distance travel, which could in turn impact rail and air services. We don't know enough yet to decide what role the railway should play or how it might adapt. To understand more, we need:

■ **Better information and insight on travel:** we have good data about ticket sales and passenger numbers, but we rely too much on surveys to understand where people travel, and when.

Smart ticketing provides the opportunity to understand properly how people use the railway.

■ **More flexibility in our fares:** there is no doubt that sales of season tickets are falling. There is also hard evidence that people are working more flexibly and that the season ticket model doesn't work for them. But, have these people stopped travelling or have they substituted season tickets for less frequent or off-peak travel? In his article, Matt flags the need to introduce more innovative fare structures, and I strongly agree. We need fare structures that better reflect the flexible way people want to travel, and that offer better value to those who travel infrequently. Fare-capping, single-leg pricing and carnets could all make a difference and better meet the needs of a modern, flexible workforce. Smart ticketing is again key to this as it enables much greater flexibility and targeting.

■ **More flexibility in the system:** the infrastructure we build lasts a long time and is difficult to change. The Digital Railway should change that, providing signalling and controls that can be more easily reconfigured so that the system can be flexed to meet the changing needs of the economy - commuters, leisure travel, freight, urban or inter-city. In this way, our investments can be adapted and flexed to meet the demands placed upon a 21st century railway.



Trevor Birch
Partner, PA Consulting

What if rail has reached its peak?



Tim Bellenger
Director, Policy and Investigation,
London TravelWatch

Rail travel has grown strongly over the past 25 years for a number of reasons, some of which are external to the rail industry - for example, the growth of mobile phone usage and capability, better information and a societal change towards more sustainable modes, or taking up driving later in life. In this case, the ownership or structure of the rail industry will not have been a deciding factor as to whether passenger numbers grew or not.

Similarly, the removal of the 'fuel duty escalator' on private car fuel has made car travel significantly more competitive with both rail and bus services in terms of cost, reducing the growth rate of rail and leading to a decline in bus usage.

The slowing of growth in 2017-18 is not unexpected, as the major infrastructure upgrades and renewals associated with electrification and with projects such as Thameslink and Waterloo, which closed the busiest parts of the rail networks, suppressed significant amounts of demand for travel. Indeed, during these projects, operators were actively trying to dissuade passengers from using their services. With the completion of these projects, which in themselves add extra capacity, this will allow demand to rise - particularly at weekends.

In addition, strikes and other industrial action, as well as a reduction in domestic tourism to London and Manchester as a result of terrorist attacks, have also had an impact in reducing demand. This is particularly important for operators such as Virgin Trains East Coast that are highly dependent on discretionary travel.

The rail industry also does not help itself to achieve the growth that it wants. While the introduction of airline-style advance purchase tickets has boosted long-distance demand, there is also evidence that the complexity of the fares system for shorter, local and medium-distance journeys is deterring discretionary passengers.

Conversely, where simplification of fares and how tickets are produced has occurred, growth has been achieved. For example, the introduction of zonal fares in London in 2007, extending Oyster pay-as-you-go to National Rail in London in 2010, and the introduction of contactless payment technology to the London area in 2014 was each accompanied by an increased use of the network. Our research has shown that complexity of fares and tickets often leads to dissatisfaction among passengers with the value for money that they get for the price of their ticket. Reducing such complexity is a necessity if passenger trust is to be gained in this area.

Season ticket usage has declined significantly in the past year (although methods of forecasting actual use against that previously modelled were not as accurate as that achieved with smartcards today). This decline reflects societal change away from fixed locations and times for employment, but also of dissatisfaction with the offer that passengers get from the rail industry.

London TravelWatch research in 2017 showed significant failings in transport operators' understandings of the needs of season ticket holders and what passengers expected from such tickets in the modern era - particularly around the purchasing environment and communication of the benefits of a season ticket. Previously, operators have assumed that passengers using season tickets have been a captive market, but this no longer holds true and needs to be addressed if rail is to retain these passengers or grow the market.



Jonathan Bray
Director, Urban Transport Group

There's something going on out there. Trend lines for long-term patronage growth, which were heading upwards at 45°, have faltered. But is it a blip, or the start of a new trend line heading in the opposite direction, into decline? A downward trend line that knocks over franchise after franchise, and decimates business cases for further rail investment.

And what's causing this reversal of fortunes? Is it the usual economic cycles, or are the sweeping social and technological changes that we are all aware of in our own lives now affecting travel trends at scale?

Nobody knows for sure - yet. However, Matt has a good crack at marshalling some respectable evidence and assumptions to make the case that (yes) the long rail boom is over, and that (yes) wider transformative social and technological change is behind it. He also reckons that there's little the industry can do, as these forces of change are operating at a much higher level than the rail sector can influence.

In short, the party is coming to an end for rail, and the hangover could be brutal. Matt has made a worthwhile addition to the growing number of reports in the category of 'everything you thought you knew about travel trends is wrong'.

However in making its case, the report does assume that relevant broader government policy is likely to remain broadly the same. Maybe, but maybe not. Housing is one example of a domestic policy area where Government is demonstrating some energy, and tackling housing needs plays to rail's strengths.

And if we are to avoid sprawl and more road congestion, then it's rail that can allow for denser housing around stations. It's rail that can open up brownfield sites (often located near or alongside rail lines), as well as extend commuting ranges.

The report does recognise the need for housing, land use planning and rail funding to be closely aligned in relation to Crossrail 2, but doesn't develop this theme, partly because it also takes a one-size fits all, London-centric approach to the UK rail market when the market is very diverse with a growing slice of it now determined in whole or in part by devolved authorities.

In many urban areas there is considerable potential for rail to grow its market share from what can be a very low base. Those urban areas also want to meet housing needs, reduce space in their city centres for road vehicles to make more space for people, improve air quality, and intensify economic activity in those city centres. It's very difficult to see how this can be achieved without rail expansion. Devolved authorities also tend to be pro-rail (evidenced by the transformation in investment levels and ambition since London Underground, Merseyrail Electrics and ScotRail were fully devolved).

In short, the future is still up for grabs, and it is far from pre-determined that rail is going to enter a decade in the doldrums. However, that future will be determined in part by the wider question of what kind of country we want to be. Will we let more dispiriting car-based sprawl rip, or will we take a happier and more sustainable route where housing and development is rail and transit-orientated? Rail's fundamentals remain strong if the latter course is chosen.