people are travelling less. That may sound strange to the rail industry, where passenger numbers have doubled in 20 years, but it is clear that overall land travel per person in England has decreased significantly. It is now 10% lower than it was before the 2008 recession (see graph, page 11). The average number of miles travelled by English residents peaked in 2007. It fell sharply, then stabilised. That has been masked by population growth of 12% between 1995 and 2014, largely through immigration which has been concentrated in the South East.

We are making fewer trips, although our trips are longer in both time and distance. In 2015, the average stood at 6,500 miles a year. Cars accounted for just over 80% of that, and rail carried around 9%.

Rail’s growth is due to a greater proportion of the population travelling by train, rather than existing passengers going further or more frequently.

All this we know from the National Travel Survey and from research by the Independent Transport Commission. What we don’t know is how this will play out over the coming decade.

There is a clear divide between different generations of transport users. Younger people are less likely to own a car than before, and are more likely to be reliant on public transport. This divide is sharpest in London. In the capital, the number of journeys by car has doubled since the 1990s, whereas in the rest of the country, the number has fallen by more than a third. London now accounts for more than half of all bus journeys. Car use is also falling faster there than elsewhere.

Perhaps the most significant change is that a correlation between income and travel has weakened. In the past, the more money we had, the more we travelled. Mobility was a function of wealth.

Rail travel per person has continued to rise, despite fares increasing by 25% in real terms over the past 15 years. Meanwhile, car driving per adult has declined, despite motoring costs remaining stagnant. Rail has always been used most by the richest quarter of the population - people with limited money are still less likely to take the train, although rail use has increased across all income groups.

“We look at transport as an economic project,” says David Brown, chief executive of Transport for the North. “It is a means to an end. The end for us is more jobs and economic growth. We need to link places of economic activity, and we are modular agnostic.

“Will there be a drop-off with new technologies? Despite lots of people saying there will, it does not seem to be the case. Our modelling shows people will travel more often and longer distances for both work and leisure.”

“For someone who can never be satisfied, plenty is not enough,” comments Professor William Power, Dean of the Faculty of Engineering and the Environment at the University of Southampton. “When you look at what we could use in health services, in energy or in transport, as a society we have an insatiable appetite. Transport policy has almost always been on a basis of ‘predict and provide’. That gets us into an untenable position.

“Take a step back. Our use of transport is very different from what it was 20 years ago – not just in commuting patterns, which have seen the London effect getting wider and wider. We are chasing our own tails. Improving journey times and increasing capacity encourages people to live further from where they work.

“Look how quickly supermarkets run out of stock, because the warehouses are now lorries moving on the motorways. Look at factories such as Jaguar Land Rover – they don’t want to store components, they want to offload components straight from the lorry onto the production line. Why? Because all the improvements we have made have just fuelled demand by changing the pattern of business, as transport has got cheaper as a proportion of total costs.

“Ford makes engines in Bridgend. But the block is cast in one place, machined in another place and assembled somewhere else. The engine criss-crosses Europe up to half a dozen times by the time it reaches the buyer at the showroom. We wouldn’t work like that if transport was not fundamentally cheap.

“Using transport as a moving warehouse is clearly not a good thing. Transport does not meet our needs, because we allow our time it reaches the buyer at the showroom. We wouldn’t work like that if transport was not fundamentally cheap.

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“The UK cannot keep on growing its whole economy by just pumping more and more investment into just one place.”

David Brown, Chief Executive, Transport for the North

> restaurants, coffee shops, theatres, discretionary shopping, courts, local government and niche businesses.

> in major cities, one-third of travel is into or around the centre, and best catered for by public transport. Two-thirds is cross-movement better catered for by more flexible systems.

> Manufacturing has long since relocated to the motorway network. The city centre load is getting lighter. It’s all about people movement. Look at the growth of urban cycling, only possible because of this change. Only just over half of rail travel is now about business and commuting. The rest is discretionary.”

Brown adds: “Transport is one part of the economic picture. We need to drive economic growth, not respond to it. It’s about skills, education standards and more. We identify the requirements on a corridor basis, not by mode - to have a clear plan is not just about improving the roads or buying new trains.

> For example, we think there is huge economic opportunity in what we call ‘energy coast’ - the energy research, generation and improving the roads or buying new trains.

> Young people are travelling in patterns that differ significantly from previous generations. In its On The Move study, The Independent Transport Commission concludes that this could be due to less secure employment, stagnant wages for younger people, high student debt, unaffordable housing costs (especially in London and southern England), and a reliance on shared living accommodation coupled with the postponement of marriage and parenthood. All these issues combine to create a much less financially secure life for younger people than in previous generations. The deferment of various life landmarks is resulting in a car-oriented existence becoming less common among younger people. And if it does occur, it is happening later in life.

Car and rail use will also be affected by changing age patterns of living. Younger people are much more likely to live in urban areas, especially in London. In shire towns and country areas, older people represent a much higher proportion of the population than they did 25 years ago. Car travel has fallen most slowly in rural areas, where dependency on cars is greatest.

“This will have to be plugged into our transport strategy,” says Dr Matthew Niblett, director of the ITC. “There will be a greater proportion of city dwellers who are commuting, compared with shire towns and rural areas. Younger people have different needs and wishes from their journey.”

A visit to Jaguar Land Rover’s design centre at Gaydon, beside the M40, is instructive. JLR has overtaken Nissan as the UK’s largest-volume car manufacturer. A new dual carriageway leads straight from the motorway to the gate, and a proliferation of cranes shows how fast it is expanding. No manufacturing is done here, but 5,500 people work on new models, including a volume-production battery-powered family SUV, ALAMY.

“Transport policy has almost always been on a basis of ‘predict and provide’. That gets us into an untenable position.”

Professor William Pouvee, Dean of the Faculty of Engineering and the Environment, University of Southampton
“Only just over half of rail travel is now about business and commuting. The rest is discretionary.”

John Dawson, Chairman of the management committee of the Road Safety Foundation

Rail use has increased in all areas. It is rising rapidly in large metropolitan centres, but is highest in London by a large margin.

“London has a particular capacity problem due to the huge jobs growth in the region,” says Niblett. “Population growth is disproportionately concentrated in the South East. To solve housing and development issues, rail will have an increasingly important part to play.”

“But the same congestion problem is becoming evident in Manchester and in Birmingham. We cannot neglect the change in commuting in other metropolitan areas. I would like to see more investment in local rail connectivity. Rail is less than 10% of passenger journeys, so the road lobby is stronger and more dominant.”

“London is a mono-centric model,” says Brown. “People largely travel in, and travel out again. London is constrained, leading to a focus on mass transit. It has more people, less space and more defined travel patterns, whereas the North has lots of centres and points of economic growth. In the North, housing opportunities are more varied.”

“The UK cannot keep on growing its whole economy by just pumping more and more investment into just one place. If we can get the connectivity right, and make it possible to live on the outskirts of Leeds and travel daily to work in Liverpool or Manchester, it becomes comparable to going into London. Business gets access to a greater labour force. We’re looking at the North as one economic unit, rather than a collection of towns and cities.”

Niblett adds “Air quality in cities favours rail over road travel. Electric vehicles will mitigate that to an extent, but city centres are increasingly pedestrianised, and we are seeing increasing merits in high-density urban living over suburban sprawl. These suggest rail will continue to have advantages, but growth might not continue at the rate seen in the last 25 years.”

“The cost of transport systems should fall with automated vehicles,” says Dawson, of the Road Safety Foundation. “The costs in future will overwhelmingly be in the right of way, the infrastructure. That is unlike today on heavy rail, where a large portion of the costs arise from the vehicles and their operation.”

“Looked at from a distance, the strikes over how many crew should be on a train are no more than friction as our transport needs evolve. But there are frictions at the road interface, too. For example, there is a public unwillingness to invest in highly automated vehicles which have some form of self-steering. But at the same time there is a public unwillingness to invest in maintenance of the roads.”

“Personally, I’d like to think the end of mindless public subsidy for buses is in sight, and that they can be replaced by funding for Uber-type technology with on-demand mobility services in rural areas.”

Sarah Kendall, an independent consultant who has worked for Network Rail and train operators, and who is a commissioner at the TTC, believes that “we are going to be challenged on funding”, adding: “We are competing with hospitals and schools for national infrastructure spending. We will have to be more joined-up in our thinking and less bothered about our contractual structures and behaviours. Our days with an orange piece of cardboard are on the way out, and we need to be more responsive to our customers.”

“Too often a rail project doesn’t look beyond the rail boundary. We need to engage better with planners and regional authorities. Railways are too important to be just left to the people that run them.”

“I’m looking out of the window across Cardiff towards the valleys, where I see railways built to get coal out of the hills to the port. Those railways have transitioned to passenger use, and are now underpinning their next transitions to cope with more capacity and new economic development.”

“It is not just about feeding people to the centre of Cardiff, it is about feeding people into Caerphilly and Pontyprryd where there are local employment markets. More like France, where rail planning across the Paris region is about connecting nodes in the suburbs, rather than just sending everyone into the centre.”

Rail Freight Group Chairman Tony Berkeley says: “There is a big challenge around smaller packages delivered to homes. Parcels is an area where rail has to change dramatically. It is not showing too many signs of that at the moment - the big freight operators are still recovering from the loss of coal.”

“In London, the number of small white vans running around is indicative of too much freight being moved in very small unit loads. We need more consolidation centres to bring things near the top of the hill. Either they need electric power or they need passing loops. Everyone knows there are problems like this, but it is difficult to get changes agreed and implemented.”

Sarah Kendall, an independent consultant and a commissioner at the Independent Transport Commission says: “Rail has not been sufficiently adaptable. That is not rail’s fault - it’s a fault of the planning system, which has tried to chase existing demand.”

“He believes the five-year funding cycles lead to a lack of vision for transport infrastructure. He says we do not take long-term decisions because it is politically expedient to patch up and keep going in the present direction.

“There are some lines that are busy all of the time, and some which are busy only at peak time. We should be looking at deliberate interventions that even out that demand both spatially and temporally.

“In fares, rail is simply doing this by pricing people off at peak times. If I go from Southampton to Nottingham, it costs £250”

“Too often a rail project doesn’t look beyond the rail boundary. We need to engage better with planners and regional authorities. Railways are too important to be just left to the people that run them.”

Sarah Kendall, an independent consultant and a commissioner at the Independent Transport Commission

Rail passenger miles per adult per year* by age and gender 1996-98 to 2012-14

<table>
<thead>
<tr>
<th>Age Group</th>
<th>All</th>
<th>Men</th>
<th>Women</th>
<th>Change 96/98</th>
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<td>10%</td>
<td>7%</td>
<td>7%</td>
<td>-2%</td>
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<tr>
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<td>14%</td>
<td>8%</td>
<td>-2%</td>
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<td>60+</td>
<td>5%</td>
<td>7%</td>
<td>1%</td>
<td>-2%</td>
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</tbody>
</table>

*NB: increases are highlighted in blue, reductions in brown; note that darker shading signifies a larger change

The growth of urban cycling is only possible because of this change. The city centre load is getting lighter. It’s all about people movement.

Salford - but they have been piecemeal token gestures. attempts to deal with that - for example, moving parts of the BBC to we not have done Birmingham to Manchester first, and then done adds Powrie. “HS2 is being built to cover existing patterns. Should

than doing it annually. But it can restrict the vision - it doesn’t allow

“Parts of the country are, in effect, full. There have been some
to reduce the impact, not

“Autor vehicles represent a disruptor,” argues Powrie. “They will be quite a long time coming, perhaps decades. The crisis yes it is a crisis of air quality in cities could force change earlier. There may be a collective awakening of society to recognise that we are making our cities unhealthy places in which to live. whenever the railway should be a bit worried about this. A benefit of being on a train is that you can use the time to do something else. But once you’re in an autonomous road pod, it becomes an alternative place to work or relax. It could be a game changer. It will be electric, and that erodes rail’s environmental advantage.

“Most of our cars do nothing most of the time. A huge amount of capital is tied up in them. If you have on-demand pods with the same utilisation as rail vehicles, you won’t need anything like as many road vehicles. Autonomous pods will jolt us out of our current track.”

“That evolution will continue to the major roads. A pay-per-use system) that are much more deeply inter-connected than simple parts. The transport network as a whole must also be seen as a system. Remember when we all used to pay the same road tax? That changed - it’s now based on the car you drive. You pay by direct debit. Mobility is becoming a personal monthly payment.

“Way over half of new car purchases are done by monthly payments, and that erodes rail’s environmental advantage.

The higher cost of living burden means learning to drive is no

“The trend of consuming travel as a service - rather than through

We can all agree that the role of transport is to enable growth - the implication is that the transport policy should deliver improved social, economic and environmental outcomes. So looking at “transport as an economic project”, as David Brown does, makes good sense. Likewise, Professor Powrie rightly states that the very real air quality crisis needs an urgent and radical transport policy response.

But it is not as simple as that. It is not the case that the transport network is a whole system - a major disruption at Birmingham New Street can have knock-on impacts far away in the country. We must be more deeply interconnected than simple

outdated ownership models of having your own car or paying for a long-term season ticket is starting to play out with changing and flexible models being used by travellers, albeit generally outside of the planned transport network. If we combine these social and economic trends (along with advancing technologies), and the environmental crisis we now face, we are entering a period of major opportunity for transport policy to turn itself on its head. One parochial point for us in the rail sector: with autonomous vehicles in advanced stages of development, the automotive sector is selling the dream of being able to ‘tweet and eat’ in your own car while ‘driving’. Isn’t that meant to be our major advantage? Rail should have already prospered, and indeed it is, in the market space that autonomous vehicles are aiming for. We must now take a proactive approach to transport policy and champion peculiarly rail characteristics.

We must plan to be the heart of many journeys but easily

PeerReview
What is transport policy for?

Rebecca Sellick
Head of Rail, Transport Research Laboratory

What is Transport for?

Nearly 30 years ago, after joining British Rail (whose transport business once extended to hotels and household removals), I wrote my engineering masters thesis entitled Painting European Transport Green. Transport was for ‘good’, I argued – providing financial and social benefits. But more transport should be delivered, albeit more sustainably.

What’s changed?

Paul Cliffon shares some statistics since the 1980s: bus journeys doubling (in London, but falling elsewhere); rail passenger miles doubling in the past 20 years (despite 25% real terms fares increases); car travel levelling off since the 1990s. He offers some insights from transport bodies such as TPN, ITS and the RFG, plus the automotive and university sectors.

What’s missing?

It’s a huge topic, so Paul cannot be all-encompassing, although omitting light rail is surprising. These ‘re-invented tramways’ have unlocked significant modal shifts from private cars into public transport, as have premium bus services elsewhere. He mentions freight (several topics in itself), but not air, despite the clear success of Eurostar having captured the Paris-London market.

What’s the right choice for future transport?

Looking at demand trends, the demographic direction of domestic travel is towards reducing car ownership and increasing public transport for work and leisure. But this is not just a matter of rail growth, as road travel really can be sustained as cars become autonomous? Self-driving cars could offer users something like the pleasant and useful on-board experience of train travel, but the dedicated buses and trains lost their flexibility and privacy. They may even better rail’s green credentials, with shorter automotive vehicle lifecycles facilitating rapid exploitation of all-electric renewable energy.

Technology now, and on the horizon

Lord Berkeley rightly identifies the challenge for freight trains to replace road transport for distribution and infrastructure investment. But they also need to stop as fast to reduce their capacity footprint. Promising cost-effective digital solutions are being developed and trialled (presented to the 2017 IR辙O Stephenson Parker Research conference).

Simple non-invasive apps conveying information and price incentives could optimise the more efficient use of rolling stock. They straightforwardly encourage greater use of spare capacity in existing trains, so more passengers benefit from the same km run. Extending this beyond the railway could encompass autonomous vehicles (freight and passenger) and connected door-to-door transport ‘joining with rail’s competitor’, rather than trying to beat them. The live debate is whether this is best market-led or dictated by a guiding mind... Future connected transport – the long-term plan

Rail’s capital and overall energy advantages remain in volume: from the efficient aggregation of individual passenger journeys to the delivery of goods. The potential is for the railway industry to adapt, so that we grow and become a more cost-effective and significant transport provider.

Christian Wolmar
Transport writer and broadcaster

There are many conflicting views and suggestions here which demonstrate the difficulty in predicting the future. But this is particularly necessary and particularly hard for transport. There are those who have to be much more focused on the future. Up until now, young people would fall out of love with the car when only a generation ago to own your first vehicle was a rite of passage.

Paul Cliffon starts off by reminding us that we are moving around less than we did 20 years ago, yet some of his respondents argue that increasing capacity massively is absolutely essential, otherwise gridlock will ensue. Yes, so far the advent of new information technology has not reduced the overall figures for travel, but that does not mean it will not do so in the future. Indeed, as the article points out, nearly half of rail travel is now discretionary. And from my own experience, conference calls and Skype technology has saved me a few journeys. Therefore, the figures may mask a shift from one type of journey to another.

Technology is the other unknown when predicting the future, and Paul notes that the car companies are engaged in secretive research on developing autonomous cars. There are plenty of optimistic statements from the motor manufacturing industry about the imminent arrival of autonomous cars, but I would counsel caution in the face of these rather gung-ho claims.

As Professor Powrie suggests: “They will be quite a long time coming, perhaps decades.” Indeed, since the hype and the billions spent so far, current versions are still at the stage that they are either a test drive or an experimental toy for the well-heeled.

I would argue that ‘never’ is a more sober assessment, at least in terms of universality. We are likely to get niche uses — perhaps ‘trains’ on a very big scale. But the Nivana promised by Google even if there is an autonomous car, it will not be able to travel safely — more an engineering function of size, than what is possible with the current technologies.

As the headlines, but this does not provide real competition to the road network, but many manufacturers and retail companies have ‘standard form’ haulage agreements with which they contract with road hauliers. These agreements set the minimum standards for the services they require, which is particularly important in the world of ‘just in time’ delivery. Where the calls are at a frequency that is much too frequent and the delivery times that work for their stores or their customers. These companies can also have an input into the environmental effects of their delivery systems, such as specifying minimum engine classes through the ‘Euro’ standards.

Planning for freight distribution systems has been a slow and painful process. Those that say that the rail industry needs to improve on. There is still a need to develop a comprehensive network of rail freight centres which can match the distribution networks of the road transport industry. Rail freight has yet to send roller trolley loads from the main warehouse to be placed on fast electric/bi-mode freight trains that can run to similar speeds as passenger trains and connect into city centre-based distribution centres. Here the trolleys can be unloaded and roller trolley loads delivered to either the relevant shops or the homes of the people who order from the online retailer using electric vans but in certain cases by cycle courier. The issue then becomes the type of service and the loads delivered by train at the distribution centres can be quickly and efficiently moved around the city. At what point will Uber or Deliveroo be providing freight deliveries?

There is already talk of technology being used to ‘platoon’ groups of lorries so that they can travel along motorways closer together, but by using a number of connected carriages on a railway line, the door-to-door for the customer is cut dramatically. This reduces the connection time, making for a relatively seamless movement between modes. This is not just the preserve of passengers wanting to come to the city or from the city, or from bus or train.

The terms on which movement of goods can be undertaken will be a key factor. Major retailers and manufacturers are used to distribution systems so fast that the freight logistics will need to meet at least some of the retailers’ key requirements. This is likely to also apply to the final mile delivery system. With the developing ‘gig’ economy, there is more scope for the sellers to set the terms under which goods are delivered and to be able to change the

Paul’s interesting article looks well beyond the railway sphere we are used to and into the larger world of logistics. As the introduction into a series of reports on the wider transport environment, and transport planning, and show that to compete where rail can enhance a competitive edge or where it needs to ‘up its game’. Arguably, the movement of freight becomes much more important than the movement of people. People can admit ideas, documents and money by electronic means, whereas physical goods still need to be transported from their place(s) of production to their place(s) of use. Distribution systems using the road network have become the main method for moving goods, with many manufacturers and retail companies having ‘standard form’ haulage agreements with which they contract with road hauliers. These agreements set the minimum standards for the services they require, which is particularly important in the world of ‘just in time’ delivery. Where the calls are at a frequency that is much too frequent and the delivery times that work for their stores or their customers. These companies can also have an input into the environmental effects of their delivery systems, such as specifying minimum engine classes through the ‘Euro’ standards.

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Planning for freight distribution systems has been a slow and painful process, and one that the rail industry needs to improve on.

Martin Fleetwood
Partner in the Transport and Infrastructure Group at law firm Shoosmiths LLP and an Independent Board Member of UK Tram

What’s missing? The live debate is whether there should be more pressure on people not to travel, particularly over longer distances. Should there be more pressure for connectivity and the establishment of virtual offices? With the growth of AI, if we look 20 years into the future and take a radical approach, how many of the existing jobs in manufacturing, for example, will actually require humans to be present?

While there is comment that autonomous vehicles disrupt the status quo, as they take away rail’s benefit of being able to work while on the move, the majority of rail trips are commutes to work or school on routes where trains provide the greatest degree of service. But this is likely to change. The group at law firm Shoosmiths LLP and an Independent Board Member of UK Tram, Martin Fleetwood, suggests that autonomous vehicles have been a slow and painful process. In the recent years, the autonomous vehicle is one of the most significant innovations that have been developed, but the implementation of autonomous vehicles is still in the initial stages. However, the potential benefits of autonomous vehicles are immense, and the transportation industry is likely to see significant changes in the coming years.

In conclusion, the transportation industry is facing numerous challenges, including the rise of autonomous vehicles, the need for more sustainable transport solutions, and the need to improve the efficiency of the existing transport infrastructure. The transportation industry must adapt to these challenges to remain relevant and competitive. Autonomous vehicles have the potential to revolutionize the transportation industry, and we should be open to exploring new technologies and solutions to address these challenges.