# The Future of Transport Policy: Was Einstein Right?

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I feel very privileged to be giving my inaugural lecture here tonight. It is really nice to see so many people from the University, the Region, the wider Industry, colleagues from elsewhere in academia and family – and somewhat unnerving to know a further 100 or so might be watching via their webcams. My thanks go to Robin and Jennifer for their hard work in making it happen.

I'm grateful to Mike for his introductory words. Mike, as my first boss was a great mentor and I also owe a big debt of thanks to Margaret Bell as my PhD supervisor for passing on her enthusiasm for the subject. Before I move on I'd like to acknowledge the massive contribution that my whole family has made to supporting my career – and particularly Emma in helping me with the choices I've made and what I've been able to achieve.

So – to matters of theoretical physics and Einstein. You'll be pleased to know I wont be taking you through any mathematical derivations tonight – but I am going to take us through the derivation of transport policy today and what I believe a more progressive future could and should look like.

## We can't solve problems by using the same kind of thinking we used when we created them

Einstein said that “we can’t solve problems by using the same kind of thinking we used when we created them”

I am going to set out, in the next 25 minutes, to explain why I think Einstein is right and why, therefore, I think that the current pathway we are on with Transport Policy is wrong. I’ve been to a few transport lectures since I set out on this career path 20 years ago and I’ve left many of them frustrated and a little depressed. So my biggest challenge of the night therefore is to make sure you leave here talking about some of the things we could be doing differently.

In order to explore Einstein’s proposition I think I first need to set out what I see as the ‘problems of the transport sector’. Before I do that though, it is worth reminding everyone of the massive economic and social benefits that the transport system affords us. Transport generates problems because, for the most part, we travel so much and we access goods and services on demand.

## Problems

It is my intention only to provide the briefest of highlights, or lowlights, to position everyone with an appreciation of the current set of problems to be tackled.

Congestion is perhaps the most obvious, well understood and long-standing of transport problems. Through the ages, wherever there have been large concentrations of people and where demand outstrips supply there is congestion. Some congestion is inevitable and even desirable but not the levels we see today.

Time spent in congestion brings business inefficiency and has negative impacts on travellers.

The statistic I want you to remember about congestion is that 89% of lost time on roads is in urban areas (Eddington, 2006).

## Climate Change

Climate change is a major global environmental challenge. In 2004 the then Chief Scientific Advisor to the Government, Sir David King, described it as “the most severe problem we are facing today”.

Transport contributes 23% of global $CO_2$ emissions (IEA, 2012), a major greenhouse gas. The UK is committed to cutting its carbon emissions by 80% by 2050.

What this effectively means is that all new cars sold in 2040 will be either electric or hydrogen powered with ALL of the electricity generated by clean renewable energy – a major cross-sectoral challenge. Some would say, a pipe dream.

Obviously recent attention has also been on climate adaptation where the severe flooding and storms have exposed large parts of our network as vulnerable. Over 250 floods on the rail network alone. We can anticipate more severe and more frequent weather variations – but how much and by when is less clear. We will have to spend more on physical infrastructure adaptation but we will also need to get smarter at social adaptation.

## Local Air Quality

There has been a great tradition of tackling local air pollution issues in the UK, particularly since the city smogs of the 1960s – pea soupers as my mum used to call them. There are now strict European wide air quality guidelines to protect the most vulnerable from damaging health effects and, back in the 2000s a belief that new vehicle technology would solve this.

But it is not yesterday's problem. Globally, Beijing and the larger Chinese cities are literally choking under the effects of pollution. Last week it was Paris that had number plate restrictions in operation.

In the UK, the government has acknowledged that 15 of our urban areas will not meet standards for nitrogen oxides by 2020 – 10 years after the original deadline. Work by James Tate here at ITS has been instrumental in explaining why the technology has not yet delivered.

## Road Safety

Road safety has been a major success story for the UK over the past 40 years. We have one of the best road safety records anywhere in the world. Total accidents are half and deaths less than one-quarter of their peak in the mid 1960s. A key message here is that **the long-term application of regulations, technology improvements, road engineering and communication have made a difference**.

Looking ahead, road deaths are still the leading cause of death for 5-19 year olds and each year almost 200,000 people– more than the entire population of York or Portsmouth - are injured every year. More can be done.

## Health

Transport sits at the heart of so many policy issues that this list could go on and on. However, I conclude the problem analysis with a reflection on public health, and in particular obesity.

One quarter of the population is defined medically as obese. Diet is a major factor here – but the equation is a balance of calories in and calories consumed.

You can't help but be shocked that 28.5% of the population do not get 30 minutes 'moderate exercise' a week. Manchester is officially the UK Lazytown capital with just over 40% of people not making that very low benchmark. (Statistics at HSCIC, 2014)

## The Balance of Policy Concerns

This slide encapsulates my interpretation of the relative balance of priority of these problems over time in the policy arena. It is based on observation but also on documentary analysis of trends in policy priorities (Marsden et al., 2012).

You can argue over the relative position of the problems or the slopes of the lines but the take home message is this. The number one priority for successive governments for transport has been supporting the economy and employment growth. Our willingness to tackle other issues has been more limited and subject to the necessary policies not damaging growth.

## The Same Kind of Thinking

So, having set out the policy problems I now need to explore the ways in which I think that the same kind of thinking that brought us here is prevailing and will ultimately, therefore, not tackle these problems.

I have identified three main areas:

1) How we think about the demand for travel – what are we to plan for and what can be influenced
2) The role of infrastructure as a solution; and
3) Technological optimism – and why we may fail to harness the undoubted opportunities ahead of us;

## Demand for Travel

If we step back in time we can see from the 1950s to the 1980s a sharp increase in the amount of travel by car and a reduction in all other modes of transport. The car opened up a previously unattainable set of destinations.

In the late 1980s the then Conservative government published a National Road Traffic Forecast which showed, essentially, a continuation of the growth seen from 1954 to 1986 such that total traffic was forecast to double by 2024.

## Investment for Growth

In parallel with the road traffic forecasts the then Conservative Government published its White Paper*, Roads for* Prosperity.

This set out a £23 billion (1989 prices) programme of road expansion, more than doubling the size of the programme with the aim of adding 2700 miles of new motorways and major roads.

Two initial problems with Roads for Prosperity were that:

1) The programme was ultimately unaffordable
2) There was not the public will to support new road building on such a scale – this was played out in Twyford Down near Southampton and the Newbury Bypass where policing and security costs were estimated at around £30m.

## A New Realism

However, the roads programme ultimately unravelled because it could not deliver what it promised. Phil Goodwin and colleagues in Oxford published their work on 'a new realism' in 1991. Put simply, Phil's work then and over the intervening period shows that:

1) If the growth forecasts were right, congestion would still grow on the major road network as the rate of construction could not keep pace
2) Even if you could keep pace with road traffic growth, trips don't start and finish on the motorway network. If you remember back to the congestion statistic, 89% of all lost time is in urban areas. The investment programme doesn't tackle these areas and will actually make things worse there.

A complex and more integrated transport strategy is necessary if we really want to tackle congestion.

This chart comes from a major study of the West Midlands area in the early 2000s, so both urban and inter-urban investments were considered on all modes. It looked at three different policy packages for the area, at a vastly increased level of investment (one which was deemed unaffordable).

It confirms, also in an urban context, that investing in infrastructure alone will make things worse, albeit more slowly than would otherwise be the case.

IF we want to tackle congestion then we need more than just infrastructure investment. We actually need more than infrastructure investment and congestion charging on our roads. We also, to the far right of the chart, need behavioural change on a significant scale. The advantage of that type of approach of course is that behavioural change also addresses some of the other policy problems.

## Curious Trends

I don't have time to review the decade of New Labour policy that followed but, whilst the principles of New Realism were embraced and the balance of spending across roads and rail shifted significantly, the promised change of direction rather stalled. Docherty and Shaw who catalogued this period concluded that "New Labour's Ministers have just not been interested enough in promoting more sustainable transport to invest sufficient thought and take the political risk ... necessary to push for major change" (Docherty and Shaw, 2009, p21)

Which brings us up to date and to a very curious yet important trend. Looking now at figures for the whole UK, the rapid increases forecast back in the late 1980s did not materialize. Indeed, since 2004, well before the recession, the total volume of traffic on the roads has stabilized. This is not just a phenomenon seen in the UK but also in other developed countries including the US and Germany. A phenomenon some people have labelled as 'Peak Car'.

There are several propositions as to why this might have happened:

1) Congestion levels are now limiting travel demand growth
2) Changes to company car tax policy have reduced car trips
3) Younger people are getting their driving licenses later
4) Mobile technology has improved the attraction of public transport (as people can now play Fruit Ninja on their way to work)

The reality is that we are not entirely sure what explains this curious yet rather important levelling off in travel demand. Clearly the recession has played into that in the past few years but it is not just a recessionary phenomenon.

Which makes the next chart I'll show you all the more difficult to justify.

## More of the Same?

This is again work done by Phil Goodwin looking at the evolution of road traffic forecasts.

Since 1989 we have continually been overestimating the demand for travel. The trend is typically to slightly reduce the rate of growth over time but broadly speaking to continue the trends along. The main drivers of growth are seen to be population growth and rising incomes.

We have had 25 years of overestimating road traffic levels. Each time the models provide a more sophisticated and accurate back casting capability – but that is not what we need to explain future demand. The same kind of thinking is prevailing

What would the response to such growth forecasts be?

The new national infrastructure plan has 121 projects across all modes at a cost of 121 billion (National Infrastructure Plan, 2013). This equates to a trebling of the budget for major road schemes. These schemes are seen to be a driver of growth and prosperity. We need to get back to building like the Victorians – what has changed? Why have the same type of solutions come to reassert themselves as the way forward?

So, to the final of my worries about the way we are thinking:

## Technological Optimism

Technology is a major opportunity for transport, the sophistication of parts of the way we manage our transport system is impressive. The advent of SatNavs and smart phones begin to layer on new opportunities. Our vehicles are increasingly automated and this has all helped improve our road safety. The google car has driven over 300,000 driverless miles. I am not a luddite.

Whether it is new infrastructure or new types of infrastructure control we have a history of expecting more than we can deliver. I've worked on traffic signal and smart motorway control in my early research career. These systems all help but they are not game changers. Lets have a look at one from the archive...

## Play You Tube Clip

The current flavour of the day is smart phone technology and big data (although I should say that Mike was telling me that these would be big back in 1998). We can now be much better informed about our surroundings and our travel options as well as the real-time traffic conditions. There are opportunities for two-way interactions between the traveller and other travellers and also with the provider. The use of shared taxis and car sharing all becomes more relevant and better quality. I don't wish to diminish the importance that will have in the travel experience, although it was sobering to hear from one technology provider that over 80% of users still have the factory settings on their Sat Navs.

My point is that these innovations all exist in the policy framework and infrastructure setting we have today. They will not necessarily tackle the problems we face and we won't necessarily be smart users.

## The Role of the State

The past thirty years have seen the privatization of the bus and rail industries and the deregulation of bus services outside of London. Layered on top of this we have a mix of devolution of powers to Scotland and Wales and the ceding of some powers to a European level. We can add to this, the push for localism and reforms to how we manage urban transport with unelected Local Enterprise Partnerships deciding about what to spend money on.

What is clear is that we have a complex delivery environment where government is increasingly steering rather than rowing.

To deliver anything requires us to be able to align funding streams, commercial interests, technical know-how and political will.

As the delivery environment gets more messy, the capacity to steer is ever diminished. Post recession we have seen 25% cuts in local transport spending and reductions in posts of 30% or more.

It is not that we cannot afford the technical capacity – because we have switched it to major capital schemes - we have chosen to shrink the state in this way. "Government is inefficient and wasteful" so shrinking it is seen to be a good thing. Spending on projects is good and spending on people and on-going subsidy is bad.

It seems to me though that we have created the conditions which promote a viscous cycle of incremental policy making. At the start I set out the complexity of the transport problem. It is difficult enough to develop a coherent package of policies to tackle this. The range of competing interests that then have to be worked through all bring transaction costs and compromises and push us towards incremental decision-making – **where what we do are the things which the interests can jointly agree on**. The package never gets delivered. Over time this has, I would suggest, vastly inflated the local political risk of trying anything significantly different – so, more ambitious packages are not even brought to the table. The tiller we are steering the boat with is smaller. The flotilla we are trying to steer is larger.

## Head in the Sand

We have to rethink our direction now because of other changes that the government has set in train.

The transition to a decarbonised transport fleet is leading to rapid and significant improvements in fuel efficiency.

The implications are shown here from Office of Budget Responsibility's data. There will be a 60% reduction in revenue from fuel duty in the next 15 years. Not only is this a major source of revenue loss for the Treasury but, critically, what it will reflect if left unchecked is a massive reduction in the per mile costs of travelling by car – on a system that already cannot cope with it.

Where else can we think of a network where demand outstrips supply and where a key plank of the solution is to lower costs to the users?

Government will not discuss changing the way we pay for travel. It is always 10 years away so not something we can tie future Parliaments to. Well, we have committed to a £40bn investment in High Speed 2 that won't open for another 12 to 16 years. The Government has buried its head well and truly in the sand on this critical issue.

SO, to the point where I share with you my current thinking on the future of transport policy and what we should do differently. Some terms and conditions or small print before I do. I say it is my thinking but I've been hugely influenced by collaborations with Iain Docherty, Jillian Anable, Elizabeth Shove, Glenn Lyons and other colleagues in the Disruption project and the Demand Centre in recent times. I should at this point flag the disclaimer that I take responsibility for the detail of what follows but without them these ideas wouldn't be on the table.

Business as usual and the continuation of an investment and technology led policy approach is the most likely course that we will follow. I hope I have set out why I think that will be to repeat the mistakes of the past and why it will ultimately fail to deliver what it promises. Yes, we will have a bigger transport system, yes we will have a more intelligent more automated transport system and yes we will have more informed transport users… But we must be more ambitious.

We can harness the infrastructure and the intelligent control systems **to do different things – not just to do the same things differently**. It remains a critical role of the state to steer and to be clear about what needs to be achieved. **What we need is an Intelligent Transport Policy to go with our Intelligent Transport System.** An Intelligent Transport Policy is one which faces all of the challenges we should address, one which is clear to the user about what is supported and what is not and one which reinforces these messages through infrastructure, prices, incentives, communication and regulation. I also think that an intelligent transport policy needs an intelligent view of the demand we are planning for, and I begin with this.

## Demand (1)

Onwards and upwards is not good enough as a basis for planning and investment.

We have not got a very sophisticated understanding of the demand we see now and less so how and why it could change in the future. The explanations we have are led by mathematical interpretations and not adequately informed by social science. For example:

- What is happening to the future of working practices? Around 3 million people are already classified as home workers. Does that matter? In what ways?
- What is the future for travel in an ageing population? How will this play out as pension provision diminishes?
- Why are we making fewer trips than we were in the 1970s? The distances we commute have stopped growing and the frequency with which we commute has fallen by 20%. Why and will it continue?

This is not a call for a decade of navel gazing but **these contradictions and reversals of long-held trends need explaining rather than explaining away**.

We have to have a debate about whether, as one ex-civil servant put it in a recent interview "travel is generally a good thing to do and therefore difficult to challenge".

Is all travel generally a good thing to do? Not if you believe the Office for National Statistics which found, from a survey of 60,000 people that "Holding all else equal, commuters have ...lower levels of happiness and higher anxiety on average than non commuters". Those who commute less than 15 minutes feel better than those that commute for more than an hour. Commuting more is not good for us.

Is the congestion on our networks today largely a reflection of our inability to charge more for using busy facilities, a premise we accept in so many other parts of our lives. The demand in the government's forecasts is not a statement of the demand that society wants or needs, rather what might be implied by the continuation of the current system.

But where does that take us? Critical though it is, an argument about what the forecasts mean doesn't tackle the problems we already face.

I think it is time to turn our attention to developing a transport policy. "We couldn't possibly intervene, it's the nanny state, unacceptable…" the debate about changing travel behaviour is too black and white but then the solutions we have put forward have been too blunt also. The failed referenda on congestion charging schemes in Manchester and Edinburgh suggest that the public feels over priced and under served as things stand.

The transition from our current fairly crude set of prices, incentives and infrastructures that are largely the same across the day, across the year and across our lives to a new intelligent transport policy position which steers and manages demand requires some thought and the development of trust with the public. We need to build up to a set of long-term coherent signals that will allow people to adapt their choices whilst understanding what is and is not being encouraged.

I am going to fly a few kites now to suggest some ways this could develop. These are examples to start a debate not the conclusion of a life's work. If change is necessary then what is that we need more of and what can we tolerate less of?

## Life-Course

I'm going to start at the whole life perspective and work down to the day.

Think of your own travel experiences throughout your life. Different houses, different cities, in school, in employment, in relationships, with children, after children, in retirement. That's a lot of change. What do we do to capitalize on change over the life course – supporting behaviours at some points and challenging them at others?

If you look at the data here from the National travel survey there are clear peaks in travel in our 30s and 40s where many people have children and are peaking in their work responsibilities. Life is complex and flexibility MAY be more limited.

However, we should look at what happens across the life course. What could be done to stimulate more travel by public transport or bike and walk during the transition from school to work? What can we do once the kids have flown home to encourage people to RETURN to being more multi-modal? People aren't 'car drivers' or not. We all have a mix of experiences we can draw from.

Our travel cards are already aligned to this type of thinking but they are not very smart and are typically focused on stimulating off-peak travel. Would people be receptive to facing different prices and subsidies throughout the life course? Would the right incentives be the ones we have now? –I doubt it.

## Seasons

Why do we have one transport policy that is essentially in place all year? OK we have winter and summer public transport timetables but really, how adaptive are our prices and our infrastructure to cater for different types of demand through the year?

This chart shows the typical profile from an urban cycle counter provided by Sustrans. We already know that people are more prepared and more likely to cycle over the Summer period. Why do we not adapt our infrastructure to promote this? How about road surfaces with more variable and intelligent lane markings that could adapt across the year or temporary build outs that reclaim the streets for cafes and pedestrians as in New York? We accept seasonality in other parts of our lives and in fact we demand seasonal adaptation (e.g. in supermarkets).

Why not change prices accordingly also for parking or fuel – such that we incentivize more active travel in the periods where people would in any case want to do it? What about reward schemes to people who commute less often by car over these periods? All of these things become possible with a more intelligent transport system – but they need a more intelligent policy framing and more coordinated action.

Would this really be unacceptable? Asking me to cycle more in June seems a little different to asking me to do it in January.

We need to find a route in to normalizing greater adaptability and flexibility in people's travel and for the state (and operators) to re-establish their legitimate role in influencing that.

## Time of Day

It is often noted that we do not have a problem of infrastructure supply, we just don't manage the demand on this network very well. By failing to do so, what we end up doing is investing in schemes which solve problems which exist on the network for relatively small parts of the day.

There are plenty of examples of more dynamic pricing systems in place that encourage people to move their journeys outside of the peak period.

In the US there are Value pricing lanes where the fees vary with level of demand, similarly Electronic Road Pricing in Singapore. It does not just have to be pricing up that is used, the example on the slide here is for free trips in to central Singapore if you arrive before 0745 in parts of the central area. But you need a system capable of dealing in rewards and penalties.

One of the interesting aspects of the Olympics travel behaviour change programme was that many people did exhibit flexibility in how often they went in to work and the start and end times of their days. This was made possible by workplaces engaging with a programme to work differently. It isn't true for everyone as we don't all have those sorts of jobs - but a collective approach with government, business and individuals seems more likely to engender meaningful change that pushing it down to matters of individual choice. The solutions are not all transport solutions.

More could be done. More should be done. If not, then, with prices scheduled to fall then the queues will grow – so unless that is a palatable future then we need to move forwards. More intelligent solutions than a blanket cordon charge for the city are possible. That debate urgently needs to happen.

## Concluding Comments

I have set out this evening to show why I feel we are making the same mistakes over again in transport policy. I am relieved to conclude that I agree with Einstein, we will not solve the problems we face with the thinking that created them. An infrastructure and technology-led strategy will make things worse more slowly but will not be transformational. It will also address only a small part of the agenda that I believe transport policy must address.

That is not to say that I think business as usual is not a viable policy proposition. In fact, I think it is the most likely one to be adopted. We would, under business as usual, need to imagine a future where we focus more intensively on adaptation to congestion and climate change, medical solutions to obesity and longer term technological fixes to air quality. The task of transport planners will be increasingly one of managing expectations and promoting niche opportunities.

I have attempted to provide an informed critique of where we are going wrong, the imperative to change, and to raise the prospect of a more flexible and adaptable future.

The opportunities that infrastructure investment and technological change provide will only deliver the potential they offer if the state steps up and sets out a clear agenda for transport for the future and provides the necessary leadership and steering mechanisms for us to capitalize.

Einstein challenges us to think differently. A change of direction is possible, desirable and not unacceptable. A more intelligent transport policy exists and is within our reach.

We've reached the terminus for the talk. All change please, all change.

Thank You

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