Policy on Sustainable Transport in England: The Case of High Speed 2

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The achievement of sustainable transport is often a clearly stated objective of government policy, but in England there is no National Sustainable Transport Strategy (NSTS). This paper outlines the nature of sustainable transport arguing for a strategic approach that takes account of the means to reduce travel through substitution and shorter trips, as well as making best use of all modes and reducing reliance on carbon-based energy sources. It reviews the recent austerity phase of UK transport policy (2010-2015) where revenue support has been cut, but capital expenditure has increased, and it comments on the difficulties of making decisions on large scale transport infrastructure projects in the absence of a NSTS. The recent policy statements and initiatives on transport and sustainability are covered, looking backwards and forwards. It then takes the case of High Speed 2 (HS2) and identifies five main narratives in the debates over the arguments in support of this huge investment. It seems that sustainable transport has not been a central part of that debate, and there is a need to reframe the discussion on HS2, as part of a NSTS.

Keywords: Sustainable transport policy, High Speed 2, speed, capacity, connectivity, wider economic impacts, image, strategic decision making.

1. Introduction

It is well known that transport has proved the hardest sector within which to address issues of sustainability and reduced carbon dependence, partly as a result of the costs of interventions (seen to be expensive), partly due the continuous growth in travel (particularly for longer distances), and partly because of the ways in which the topic has been conceptualised and analysed. The understandings of contemporary mobility systems are embedded in a basic engineering and economic perspective that sees transport problems as self-evident and requiring technical solutions (Macmillen, 2013). Problems such as congestion, lack of capacity, pollution and safety can all be addressed through investment decisions, regulation, pricing and new technologies, and that behavioural responses demonstrate instrumental rationality. Such conceptualisations of transport problems and solutions, demonstrate a simplicity that does not reflect the complexities of decisions that many businesses and people have to take. These approaches are embedded in ways of thinking about mobility systems that have arisen when transport policy was primarily concerned about facilitating the growth in carbon-intensive forms of movement (Banister, et al., 2011).

Sustainable transport has two main dimensions. One that attempts to reduce the need for travel through the spatial distribution of land uses so that distances can be minimised or through the

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use of technology to substitute for travel (e.g. through working from home). The other is to ensure that the most efficient form of transport is used, and that any energy needed is provided from renewable or non-carbon based sources. These are the essential elements of the sustainable mobility paradigm (Banister, 2008). In addition, there are two cross-cutting issues that link these dimensions together. All modes of transport (road, rail, air and sea) should be examined in a holistic way as part of a multimodal mobility system rather than as a set of individual modes competing with each other. The second aspect is that in a technological era, transport should be seen as a service that meets the accessibility needs of businesses and individuals.

Much of the debate on sustainable transport in England has concentrated on cities, and innovative solutions have been implemented, including giving priority to pedestrians, cyclists and public transport, and exploring a variety of means to limit the use of cars through regulations and controls (Handy, 2015). More recently, innovation has been extended to cover mode sharing, and travel is beginning to be seen as a service. In the near future, city transport may be based on electric vehicles and autonomous vehicles that are hired, and some parts of the city may be car free. Sustainable transport is slowly becoming a reality in cities (Hickman and Banister, 2014).

When considering sustainable transport for long distance journeys, the options are much more restricted as there are fewer options and the possibilities for integration between modes seem more limited. However, this is where most increase in travel has taken place in England. Since 1972/73, there has been as slightly decline in the numbers of trips made (from 956 per person per year in 1972/73 to 914 trips per person per year in 2015: decreased by 4 per cent), but the average annual distance travelled has increased by 49 per cent (from 7161 kms per person per year in 1972/73 to 10638 kms per person per year in 2015) (GB Department for Transport, 2016). These figures exclude international travel. The total time spent travelling each year has remained constant (about 368 hours per person per year), meaning that on average people are travelling faster (speed has increased by 42 per cent) and further (distance has increased by 55 per cent) for each trip made. All things being equal, this means that transport is becoming less sustainable rather than more sustainable (Banister, 2011).

This paper addresses these questions within the context of England through reviewing recent policy initiatives on sustainable transport (Section 2) and a case study built around the debate over High Speed rail 2 (HS2) (Section 3). These substantive Sections are followed by a discussion on the importance of a National Sustainable Transport Strategy (NSTS) and how needs can be met in more integrated and sustainable ways (Sections 4 and 5).

2. Recent Sustainable Transport Policy Initiatives in England

The focus here is on the recent past (the post 2008 period), where the UK Government has pursued an austerity programme that has substantially cut levels of public expenditure from about 45 percent of GDP (2010) to 41.4 percent (2015)[2]. Transport has been one of the main UK Government Departments that has had its budgets cut, at least for revenue support (Tables 1 and 2). Conversely, the investment through the capital budgets has substantially increased as a result of a series of major new investments, mainly in London (e.g. Crossrail and Thameslink). Table 1 has attempted to summarise the main themes and priorities in the austerity phase of Government policy. On the one hand there is a desire to devolve responsibilities to the local level where there is greater accountability and responsiveness, but at the same time there is an equal desire to reduce levels of public expenditure that form the basis of central government macro-economic

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[2] In 2008, Public expenditure was £382 B and GDP was £1434 B (40.6%) – the corresponding figures for 2010 were £673 B and £1500 B (44.9%) and for 2015 £748 B and £1807 B (41.4%)
http://www.ukpublicspending.co.uk/uk_gdp_history

policy. There is very little mention of sustainable transport, and at no stage has a National Transport Strategy been discussed.

However, there has been a clear shift in the role that the planning system should be playing as the facilitator of development (often narrowly interpreted as economic development), but at the same time promoting sustainable development (to take account of wider social and environmental objectives). In many cases these two objectives are in opposition to each other, and this has resulted in decisions on new developments, including major transport projects, having a lengthy delay between the application and approval. To some extent this issue has been addressed in the Planning Act (2008) and in the National Planning Policy Framework (NPPF) (2012), mainly through reductions in the time for consultation. But extensive delays still occur, mainly due to the sensitivities about the political implications of large scale infrastructure investment decisions (e.g. HS2 and London's 3rd Runway). Ironically, there has been a greater centralisation and control over decisions on major projects, but the politicians are becoming increasingly wary about actually making these decisions themselves.

Table 1.   Main Policy Statements and Interventions in England on Transport and Sustainability – The Austerity Period (2010-2015)

2008 *Climate Change Act*	Sets out a legally binding target to reduce overall UK emissions by at least 80% below 1990 levels by 2050, together with a system of five-year carbon budgets.
2008 *Planning Act*	Introduced a new process for Nationally Significant Infrastructure Projects (NSIPs) - large scale projects (relating to energy, transport, water, or waste) that require 'Development Consent'. Extended in 2013 to allow certain business and commercial projects to opt into this process. A Development Consent Order (DCO) automatically removes the need to obtain several separate consents (including planning permission), and it is designed to be a much quicker process. The DCO process starts when an application is formally accepted by the National Infrastructure Planning Unit and lasts approximately 12-15 months. The final decision on granting a DCO rests with the Secretary of State, based on advice from planning inspectors – known as the 'examining authority'. Applications for DCOs are decided in accordance with National Policy Statements (NPSs), which after a process of consultation and Parliamentary scrutiny are formally 'designated' by Government – these are projects of national priority.
2010 *National Infrastructure Plan* (October) the Chancellor of the Exchequer, George Osborne, explained his decision to spend on infrastructure	"Tackling this budget deficit is unavoidable. The decisions about how we do it are not. There are choices, and today we make them. Investment in the future, rather than the bills of past failure: that is our choice. We have chosen to spend on the country's most important priorities: the health care of our people; the education of our young; our nation's security; and the infrastructure that supports our economic growth. We have chosen to cut the waste and reform the welfare system that our country can no longer afford." George Osborne, Spending Review Statement to Parliament, 20th October 2010
Coalition Government (2010-2015)	Little enthusiasm for 'integrated transport strategy' policy making, preferring instead locally decided initiatives to deliver improvements
Commons Transport Select Committee (2010-2015) and the response from the Department for Transport (DfT)	This Committee has issued the Department for Transport with a number of recommendations urging a more integrated or joined-up strategy. The response from DfT "The Department's vision is for a transport system that is an engine for economic growth but is also greener and safer and improves quality of life in our communities. The Business Plan clearly sets out how we are going to deliver this, including the development of a new high-speed railway, tackling carbon and congestion on the UK's roads and promoting sustainable aviation" (2011).
2011 *Securing the Future: Delivering the UK Sustainable Development Strategy*	This landmarkmajor policy document paid little attention to transport, apart from saying that it is a major contributor to carbon emissions. Measures in transport were mainly cleaner fuels, alternative low carbon technologies, and some mention of aviation as an increasing problem (pp84-85). New developments should be located in areas such as town centres which are accessible by means of walking, cycling and public transport, thereby reducing reliance on the private car (p117).
2012 *National Planning*	The NPPF provides a framework within which local people and their accountable

Policy Framework	councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities. It is framed within the UK Sustainable Development Strategy (2011) and there should be a presumption in favour of sustainable development in plan making and in decision processes.
2015 Transport Priorities Five policy themes are likely to be prominent during the current Parliament (2015-2020)-	*Devolution:* Acceptance of multi-level governance and more local accountability, with local government taking on more responsibilities, as well as the Local Enterprise Partnerships, the Integrated Transport Authorities in the metropolitan areas outside London, and the elected Mayor and Transport for London in the capital. Central government retains reserved powers for 'national' transport, such as aviation and maritime policy, and strategic road and rail. The EU acts on transport issues where there is a transnational element – such as on almost all aviation and maritime issues, type approval of road vehicles, licensing, and transport networks. *Local bus services*: Bus travel has been in long term decline since the 1950s: current levels are less than half of those seen in the immediate post-war years – except in London where it has doubled to 2.38 billion bus journeys (1986-2014). Move towards Quality Contract Schemes and partnership operations (*Local Transport Act* 2008). Rethinking bus routes and funding are key issues, as well as the future of concessionary schemes. *Rail franchising:* Rail travel is expensive and privatisation has not worked. *Rebuilding Rail Report (2012)* stated that the cumulative quantifiable costs of the 'privatised and fragmented' railway system were somewhere in the region of £11.5 billion (p18). The key issues here are whether the management structure and the governance structures are 'fit for purpose'. *Cycling:* Distance has increased by 12% since 2010, and this forms a key part of the sustainable transport strategy. The *Local Sustainable Transport Fund* (LSTF) is a £550 million fund available for local transport authorities outside of London with the aim of changing patterns of travel behaviour, and increasing the use of sustainable transport. The *Infrastructure Act 2015* requires the Government to produce a Cycling and Walking Investment Strategy for England, setting out not only the Government's ambitions and the funding implications – safety and separate infrastructure are key concerns. *Airport expansion:* The Airports Commission concluded that based on demand projections, without additional capacity, major London and South East airports would be full by the 2040s, even with a carbon cap in place. Recommended a new 3rd runway at London Heathrow

Sources: Butcher, L, Meakin, A and Rutherford, T (2015) Transport 2015, House of Commons Briefing Paper 7177, 14th May 2015, p164;
Department for Transport (2011) Creating Growth, Cutting Carbon, Cm 7996, January, p12 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/3890/making-sustainable-local-transport-happen-whitepaper.pdf;
Department for Transport (2015) Local Sustainable Transport Fund Annual Report 2013/14, February https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/408675/lstf-annual-report-2013-2014.pdf;
Department for Transport (2013) Aviation Policy Framework, Cm 8584, March https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/153776/aviation-policy-framework.pdf;
Department for Communities and Local Government (2012) National Planning Policy Framework, March, http://planningguidance.planningportal.gov.uk/wp-content/themes/planning-guidance/assets/NPPF.pdf;
Department for Environment, Food and Rural Affairs (2011) Securing the Future: Delivering UK Sustainable Development Strategy, Cm 6467, March https://www.gov.uk/government/publications/securing-the-future-delivering-uk-sustainable-development-strategy;
Airports Commission (2015) Airports Commission: Final Report, July, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/440316/airports-commission-final-report.pdf

Transport is seen as part of the NPPF (2012), as it contributes to sustainable development, and to the wider sustainability and health objectives of policy. The NPPF promotes local diversity and different (but appropriate) solutions being adopted in different locations. In addition, all

developments that generate significant amounts of movement should be supported by a Transport Statement or Transport Assessment Plan that takes account of the possibilities for reducing the amount and impact of additional traffic: "Plans and decisions should ensure developments that generate significant movement are located where the need for travel will be minimised and the use of sustainable transport modes can be maximised" (para 34). Travel Plans now have to be produced to demonstrate efficient delivery of goods and supplies; give priority to pedestrians and cyclists, together with access to public transport; creation of safe and secure layouts; incorporate facilities for recharging electric vehicles; and consider the needs of those with disabilities. These issues all form key components of sustainable transport. Although sustainable development provides the central element in the implementation of the NPPF, sustainable transport is just one of the 13 subthemes, and nationally significant infrastructure projects (such as HS2) are explicitly excluded from consideration (Section 5).

Government is clearly devolving most small scale decisions to the local level, but at the same time maintaining control over finances and overall priorities (Table 2). It is central government that has identified the five issues (through their manifesto commitments – see last part of Table 1) that will form the main new initiatives over the next five years. Yet at the same time, central government is investing substantial resources in new projects (rail and road) and in encouraging airport development in the London region (Tables 1 and 2). There has been no progress on any form of NSTS, or looking at the need to reduce travel demand, or to viewing transport as a service, or in addressing integration between the different forms of transport. More generally, the debates around sustainable transport have been downgraded, as the emphasis of both austerity and post austerity policy has been to promote economic growth at all costs.

Table 2.   Main Expenditure Priorities in Transport – The Post Austerity Period (2015-2020)

2010 – 2015 Summary (from Table 1)	The DfT saw its budget cut by 17.7% (from £23.4 bn to £20.4 bn – in 2014 prices), but at the same time, capital spending on transport infrastructure projects increased from £7.7bn in 2010/11 to £10.1bn in 2015/16 – a 31% increase
2013 Rail	Investment in High Speed rail 2 (HS2) from London to Birmingham and Leeds/Manchester 2017-2026: Stage 1 to Birmingham £21.4 bn 2033: Stage 2 to Leeds/Manchester £21.2 bn Plus Rolling stock £7.5 bn (all at 2011 prices)
2013 Roads	£15.2 bn to strategic roads to 2012 – this is 3x the current level and will result in 80% of the network being resurfaced. Smart motorways and hard shoulder running. 'A' roads redesignated 'expressways' and will also be eligible for funding
2015	Highways Agency renamed Highways England – devolved and arms length with funding certainty to 2021
2020	Roads Fund to be set up with all Road Tax from Vehicle Excise Duty (VED) being hypothecated to fund roads expenditure. The new VED will be the same for all cars, ending the carbon related charge

Roads policy to be placed in the wider economic, technological and social environment

Sources: Department for Transport (2011) A Fresh Start for the Strategic Road Network, An Independent Report Chaired by Alan Cook, November, https://www.gov.uk/government/publications/a-fresh-start-for-the-strategic-road-network;
HM Treasury (2013) Investing in Britain's Future, Cm 8669, June, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/209279/PU1524_IUK_new_template.pdf;
Department for Transport (2013) Action for Roads: A Network for the 21st Century, July, https://www.gov.uk/government/publications/action-for-roads-a-network-for-the-21st-century;
Department for Transport (2013) National Road and Rail Network: Draft National Policy Statement, December, https://www.gov.uk/government/consultations/national-road-and-rail-networks-draft-national-policy-statement;
Department for Transport (2015) Road Investment Strategy for the 2015/16 to 2019/20 Road Period, March, https://www.gov.uk/government/publications/road-investment-strategy-for-the-2015-to-2020-road-period.

This is consistent with previous policy that concentrates on technical and economic solutions to transport problems, and the concern over greater consumer choice being seen as desirable. It does not address issues relating to integration across modes, the links between land use and transport, the carbon issues raised by transport, wellbeing and equity in access to transport. These issues, together with high costs (of rail) and poor quality bus services, are recognised but there has been little action. The different modes of transport are seen to be competing with each other rather than combining to provide a 'seamless system' that would provide a high quality service for all users. It is difficult to make sense of the strategic aims of this rather disjointed approach to transport policy, and the uncertainties that this results in for businesses and investors. Underlying the debate has been the controlling influence of the Treasury and the overriding objective of substantially reducing levels of public expenditure. Even here, this policy has been applied inconsistently, and this can best be illustrated with respect to High Speed rail (HS2).

3. Case Study – Sustainable Transport and HS2

The debate over High Speed 2 (HS2) in the UK well illustrates the rather disjointed approach being taken to important infrastructure investment decisions. HS2 is a new high speed rail (HSR) line (300 km/hr) between London and Birmingham (Phase 1 – to open in 2026) and then to Manchester and Leeds (Phase 2 – to open in 2033), with a total cost (including contingencies) of £50 Billion (2011 prices). There have been numerous publications on the case for and against HS2, including GB Department for Transport (2010a and 2013), House of Lords (2015), Hall (2013), May and Tyler (2016), Tomaney and Marques (2013), and Butcher (2014). Many different issues have been raised, and five of the key narratives are used to demonstrate the different arguments in the debate on HS2 and sustainable transport.

3.1 Speed

Initially, the main benefits of HS2 were seen to be faster journeys and the core of the business case was travel time savings for business users. These values have subsequently been reduced by almost a third, but to some extent balanced by an increase in the numbers of business travellers. The demand forecasts were also seen as being optimistic as they were related to high economic growth rates, and the levels of long distance (over 100 miles). HSR demand was expected to increase by 1.9 per cent per annum to 2043, a rise of about 96 per cent on current levels (2011) (Castles and Parish, 2011, p29-30). The growth in rail (classic and HS2) will increase by three times, as their market share grows more than that for other forms of transport. Castles and Parish (2011) question the forecasts, but also the longer than usual time horizons, but they recognise the inherent uncertainties in all forecasts. Their best estimates for HSR demand are 30 per cent lower than those used in the official demand forecasts, and this fact on its own would reduce the Benefit Cost Ratio (BCR) from 1.6 to 1.1, making the project marginal as an economic investment decision (Castles and Parish, 2011, Table 1).

Overall, about 75 per cent of all user benefits have been attributed to travel time savings, and this level is consistent with other large scale transport investment projects (Bristow, 2016, p285). The way in which travel time savings are used in transport appraisal, and more generally in modelling, is key to demand forecasts and to the evaluation of investment alternatives. If sensitivity analysis is carried out as part of the evaluation and the value of working time is set at the commuting rate, this reduces the BCR from 1.6 to 1.2, again making the project marginal (Castles and Parish, 2011, Table 1).

If speed is placed in the framework of sustainable transport, then higher speed is not sustainable as more energy is used and trip distances are likely to increase (Banister, 2011). The only sustainable situation here would be if the electricity was generated from 'clean' sources, but the

UK energy mix[3] (2015) is still heavily carbon based, with under half being generated from renewables (25 per cent) and nuclear sources (21 per cent). From a sustainability perspective, the more flexible concepts of 'reasonable travel time' and travel time reliability may be more appropriate ways to determine investment priorities, as speed is only one part of the travel experience (Banister et al., 2016). The real value of travel time savings is only realised if the saved time is used to increase output and productivity, and the productive use of time whilst travelling by rail is an important element in this debate. The real value of 'saving' time and the associated energy costs of high speed have not been central parts of the HSR debate.

3.2 Capacity

The second narrative has focused on the need for additional capacity, and HS2 was seen to be the best way to deliver this. This reasoning was behind investment decisions to build the Shinkansen in Japan and the TGV in France (Givoni, 2006), and more recently the HSR in China (Fu et al. 2012). In the UK, the need for HS2 was accentuated by the forecast growth in the demand for rail, especially on the West Coast Main Line[4], and expected lack of peak capacity. Part of the concern here has been with the reliability of rail travel, but it also covered the overcrowding of trains. The initial HS2 plans included 18 train services per hour from London at peak, when each train can provide over 1000 seats (2 sets of 200m long trains). This capacity will not only serve demand on the HS2 route, but importantly it will free capacity on the conventional network as a result of the diversion of some demand to the HS2, and it will also allow more track capacity for use by freight trains. All these factors together serve several policy goals, including shift of freight transport from road to rail, and they are expected to form the large bulk of the economic benefits of HS2.

Doubts have been raised whether it is technically feasible to run 18 trains per hour. In comparison, Eurostar normally operates three trains per hour and can increase this to five at peak, while in Japan and France, where there is a much longer tradition of HSR operations, 12 trains per hour is the maximum frequency achieved[5]. The demand for 18 trains per hour (a maximum of about 18,000 passengers per hour) is only likely to exist at the peak, but demand will be much lower at other times.

Capacity increases on rail provides an important element in the sustainable transport debate, as trains running with high load factors are efficient users of energy. The real question here is over whether that capacity increase can best be provided through a dedicated HSR system, or through additional capacity in the conventional rail system. There are also possible abstraction impacts, as diverting demand and services from the conventional network to HS2 could result in lower quality services to the passengers remaining on these routes. HSR only serves the main cities and does not stop at the intermediate cities. The new HSR line may also abstract a higher proportion of the operating and maintenance resources, and this may have a detrimental impact on the conventional network, further suppressing demand (as has happened in France – Cour des Comptes, 2014).

Investment in HS2 provides an increase in capacity on a very specific route, benefiting a few locations (stations), and suggestions have been made about whether there are cheaper ways of providing additional capacity. These suggestions have included longer trains, reconfiguring trains, more standing room in trains, investing in signalling and other control systems, and the use of peak pricing methods (Starkie, 2013). Many other lines in the South East are far more congested than the proposed route of HS2, and Castles and Parish (2011, p17) have commented that the capacity of the standard class seating on the WCML can be more than tripled from the

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[3] http://www.energy-uk.org.uk/energy-industry/electricity-generation.html
[4] WCML is the West Coast Main Line in the UK that runs from London, through Birmingham, Manchester, and Liverpool to Glasgow in Scotland.
[5] Response to questions 82-83 in the Oral evidence to the House of Commons Transport Committee, 21 June 2011, http://www.publications.parliament.uk/pa/cm201012/cmselect/cmtran/uc1185-i/uc118501.htm

2008 base at a relatively low cost. A slower rail network might be more reliable and provide more capacity to a greater number of travellers, and the contribution of the rail system as a whole to sustainable transport would be increased.

3.3 Connectivity

Connectivity covers the ease of getting from one's origin to one's destination, and speed here plays a role, but it is the average speed door-to-door (not the maximum speed) and ease (or inconvenience) of transfer between modes of transport that is central. Although it is the main (the high speed) part of the journey that receives most attention, and this is the part of the journey that will cost the most to provide or improve, the potential in reducing overall travel time door-to-door is most likely to be achieved by interventions at the station and in improving its accessibility by other modes of transport (Givoni and Rietveld, 2007; Brons et al, 2009).

Railway stations are the access points to rail services. Yet, the nature of HSR suggests a low number of intermediate stations along the route, as each stop can 'cost' up to 15 minutes[6], making HSR more difficult to access. HSR in this respect might be viewed like an airport, although a noticeable advantage HSR has is that its station(s) are often in the city centre. But city centre location is costly, due to the size of the station (each train can be 400m long) and the need to traverse densely populated areas, often requiring tunnelling. City outskirt location could reduce such costs, but this option will make the station even less accessible for most passengers (Banister and Givoni, 2013). It is here that there should be strong links with sustainable transport, as HSR is part of the total transport network, and access to and egress from HSR stations should be seen as part of the overall journey. To compensate for the low number of stations, HSR should be fully integrated with the rest of the transport network, and it is this integration that will increase connectivity, namely the ease of getting from the trip origin to many different destinations (e.g. in Taiwan; Chou et al., 2011; and in the UK at Birmingham; Martínez Sánchez-Mateos and Givoni, 2012). Yet here again, there seems to have been little discussion over how HSR is integrated with and how well it is connected to the conventional rail system and other modes of transport.

3.4 Wider Economic Impacts (WEI)

These three narratives all relate to the transport elements of HS2, but there are also two other issues that have featured in the debates. Justification of investments in HSR has been increasingly based on the wider economic benefits, including employment, regeneration and agglomeration benefits. The Department for Transport have estimated that HS2 would create 3,100 permanent jobs in operating the new railway and around 24,600 temporary jobs (excluding the supply chain) during construction. There might also be up to 400,000 jobs in additional developments in areas close to HS2 stations (House of Commons, 2013, para 34). These estimates were based on a report prepared for the Core Cities Group[7] by consultants (Volterra/Arup, 2011, p2), and they are controversial. It is not clear that investment elsewhere in the economy, for example in improving and developing the conventional rail network or investments outside the transport system (in education), would not provide similar or greater employment benefits.

A considerable amount of research has been carried out on the agglomeration effects, mainly with respect to intra-regional changes, and the key question here is whether they are also found on an inter-regional scale as well (Graham and Melo, 2010). The basic argument is that improved connectivity within a city or region can compound the benefits of agglomeration by making spatial economic transactions between firms and other organisations more efficient through mechanisms such as sharing, matching and learning (Duranton and Puga, 2004). There are difficulties here in the specification of the relationships and in their measurement, and in the

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[6] Connor P (2011) Rules for High Speed Line capacity, Railway Technical Web Pages: http://www.railway-technical.com/Infopaper%203%20High%20Speed%20Line%20Capacity%20v3.pdf

[7] The cities concerned are Birmingham, Bristol, Leeds, Liverpool, Manchester, Newcastle, Nottingham, and Sheffield.

implied causality (including the strength of the statement – whether agglomeration effects cause higher output or productivity). Graham and Melo (2011) examined long-distance travel flows in Britain to provide an indicative assessment of the potential order of magnitude of agglomeration benefits, resulting from travel time reductions. They draw conclusions from this analysis by making inferences as to the likely effect on HSR and conclude that (p15) "even in the best case scenario for the improvement in long-distance travel times and the market share of classic and high-speed rail, the potential order of magnitude of the agglomeration benefits is expected to be small." They qualify their conclusion by saying that their analysis refers to the domestic market but "benefits could also arise from improved connections to continental Europe (e.g. Paris, Brussels, and Amsterdam) by linking HS2 to HS1" (ibid). From this econometric analysis, it seems that the agglomeration effects observable at the intra-regional level are either not apparent or are difficult to measure (or both) at the inter-regional level, where HS2 is likely to have most impact. In terms of sustainable transport, agglomeration benefits are important as they could shorten trip lengths and allow firms to operate more efficiently, but conversely there could be an increase in commuting journey lengths as labour market areas are extended.

3.5 Image
The final narrative has been that HSR is seen as promoting a modern view of transport and the UK is lagging behind its European neighbours and international competitors. Unlike many other countries like Spain, Italy, Germany and France, and those outside Europe, such as Japan and China, the UK (where rail transport was invented) has not joined the HSR era, despite one short high-speed line (HS1). The UK rail network is perceived as being old, crowded, and unreliable, and this could reflect on the whole image of the country. The speed of the HSR is central in the image of an advanced, state-of-the-art rail development and technology. High-speed was originally considered to be over 200km/hr, and this maximum speed has been increased to 350km/hr (the maximum operating speed of French and Chinese HSR), so it is not surprising that the HS2 was originally designed with a maximum operating speed of 400km/hr[8]. Image depends on whether the perceived efficiency of the rail transport system of a country influences the overall perspective of foreign investors and companies about whether they should invest in that country.

Governments are accountable to the electorate, but major decisions like HSR require cross party support and a clear promoters to push the decisions through the Parliamentary processes (Dudley and Banister, 2015). A recent example of this change has been from David Higgins, the Chairman of HS2 Ltd, the executive agency charged with implementing the HS2 project. He has stated that HS2 responds to a "national need" and that HS2 is a "catalyst for change", as there is a lack of rail capacity South of Birmingham and a lack of connectivity in the North, both between the northern cities and to the south. He is now trying to build a strong consensus and an alliance around these overtly political and emotional images (GB Department for Transport, 2014).

4. Reframing HS2 as part of a National Sustainable Transport Strategy (NSTS)

Sustainable transport has not featured strongly in the debate over HS2. It is the economic factors that have dominated the discussion, even though each of these main components has been challenged. Business has cast doubts over the value of the project. For example, the CBI (Confederation of British Industry) originally supported HS2 but later cast doubts on its business case, by stating "Important questions need to be answered before we undertake a project of such significance, in particular about how the project would be financed and managed as well as how

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[8] Raising the speed from 300 to 360 km/h increases energy consumption by 23 per cent, http://assets.hs2.org.uk/sites/default/files/inserts/hs2%20traction%20energy%20modelling.pdf

a new high-speed rail network would complement existing transport networks" (CBI, 2010, p1). The CBI also stated that HS2 could strengthen long term economic prospects, but that six conditions would need to be met if business support was to be guaranteed. These conditions were that the government must - ensure commitment to the full high-speed network; promote international gateways and networks; get private sector funding agreed before construction starts; safeguard any negative effects on rail freight; safeguard spending in other areas of transport capital spending; and support climate change objectives. The issue of finance has been notable by its absence from all of the analysis, even though it is implicitly accepted that the project would be publicly funded. The concern over complementing the existing transport network is part of the connectivity theme, and this in turn is strongly linked with integration of the transport system.

The Institute of Directors (IoD) has called for the Government to abandon HS2, branding it as "a grand folly" (IoD, 2013). A survey of IoD members found that 27 per cent felt that HS2 represents good value for money and 70 per cent stated that the scheme would have no impact on the productivity of their business. The IoD survey reported that only 6 per cent of Directors say they never work on the train, with 48 per cent saying that they spend at least half the journey working, and a further 26 per cent work for between a quarter and half the time, and 21 per cent spend up to a quarter of the journey time working – their conclusion is that work is an essential part of travel by high speed rail and that travel time is productively used. This comment links in with the wider economic impacts of HSR, and the view that such an investment would not be transformative on its own, but only if other conditions were present. These essential supporting conditions cover non-transport factors such as a high quality labour force, agglomeration economies, positive externalities, network economies, inward investment, a supportive planning system, complementary policies – see Banister and Berechman, 2000, pp318-320).

However, it is on the three other transport headings (speed, capacity and image) that a NSTS could be framed. A sustainable transport strategy would promote shorter and slower journeys, strengthen the positive travel experience (including reliability and seating), and see HSR as an integral part of a NSTS and not just as a single (important) link in that network. It is here that the environmental lobby has been unable to provide a coherent strategy that might redress the balance away from the overriding economic (and political) focus of the debate towards one that addresses sustainable transport. In sustainable mobility terms HSR offers an effective alternative to continued investment in roads, but at the same time it has substantial environmental impacts, particularly if it passes through environmentally sensitive areas, such as the Chiltern Hills (Cornet et al., 2016). Rather than oppose HS2 on sustainability grounds, the environmental groups have sought to mitigate its local impacts.

The environmental lobby has joined the promoters of HS2 (2011) by signing up to The Right Lines Charter, which was initiated and organised by the Campaign to Protect Rural England (CPRE) with assistance from the Campaign for Better Transport (CBT). The Charter stated that HSR must reduce the damaging impact of travel on the environment by shifting journeys from road and air to rail, and that in addition HSR represented only one option for increasing rail capacity and connectivity (Section 3). The Charter criticised the government for its HS2 proposals not being part of any comprehensive long term transport strategy, and also called for the adverse environmental impacts to be minimised. The concept of the NSTS is embedded in the Charter, but the basic support for the principle of HS2 has inevitably provided the main focus for discussions, and the wider issues of the sustainable transport strategy have been downgraded. It was therefore highly significant that the signatories to the Charter included not only members of the environmental establishment, such as the Royal Society for the Protection of Birds, the Wildlife Trusts, the Woodland Trust and the Ramblers, but also more radical groups such as Greenpeace and Friends of the Earth.

The links between the environmentalists and the pro HS2 interests were further strengthened in 2012 with the setting up of the HS2 Environment Round Table. This consisted of representatives

from a wide range of environmental groups, the Department for Transport (usually including ministers), and HS2 Ltd. The Round Table was to discuss high level principles concerning the project, including the engagement/decision making processes, environmental sustainability, and how HS2 fits into wider strategies. This might be seen as the means to address the need for a NSTS, but the environmental lobby had now become political 'insiders,' while the Round Table has fitted in well with the objectives of the government and HS2 Ltd, as they have retained tight control of the agenda.

The main advantage of the Round Table for government has been the acceptance by the environmental lobby of the need in principle for HS2, with the discussion being over the detail. Significant additional mitigation has been achieved at the local level, with 21 percent of the London to Birmingham route now being in tunnels. But the environmental lobby and those opposed to HS2 have not been able to build a coordinated national campaign against HS2, as was the case with roads (Dudley and Richardson, 2000). Those opposed to HS2 have sought to fill the gap left by the environmental lobby by forming unexpected alliances, such as with right wing free market parties and groups including UKIP (United Kingdom Independence Party) and the Taxpayers' Alliance, who oppose HS2 chiefly on the grounds of its public expenditure costs.

The dilemmas that the environmentalists have faced in defining the sustainability of a project such as HS2, illustrate how these ambiguities are defined have a profound influence in determining its political success or failure. The development of a NSTS is no further advanced, as the framework within which decisions on major infrastructure projects can be placed. The decision process has been changed with those traditionally seen to promote sustainable transport now being seen as insiders in the process, and their role is to mitigate environmental impacts, rather than challenge the project as a whole. In the meantime, the HS2 project remains on course for Parliamentary approval (2017).

5. Conclusions

Three important lessons can be learned from the HS2 experience and they help make the case for a NSTS. First, strategic decisions in transport now seem to be based on their legacy value. One basic question here is the extent to which analysis and expertise can help in making decisions that take more than 10 years to realise (HS2 Phase 1 will open in 2026 and Phase 2 in 2033) or at least three Parliaments, and where the main beneficiaries are today's young or tomorrow's people. Over 70 per cent of current rail users are between 25 and 60 years of age (GB Department for Transport, 2010b), but the main beneficiaries of HS2 will be future generations.

Secondly, there is still a need for analysis, but narrow based Benefit Cost Ratios are too restricted in terms of their assumptions and they have proved to be unreliable, being over optimistic in both their demand forecasts and their cost estimates (Flyvbjerg, 2007). The current debate over whether travel time, particularly by HSR where distances (and times) are long, is wasted or productive continues, but it is clear that travellers in the future will be able to make more use of it than at present and in ways that we have not currently thought about. Analysis that depends on the wider economic impacts is also currently limited, as issues around causality, whether employment opportunities are new (and permanent) or transfers between locations, the treatment of time, and the role that external factors play (economic, social and technological), all contribute to increased uncertainty.

Thirdly, throughout the debate there has been very little said about the costs of HS2, who should pay for it, and who are the main beneficiaries of HSR. Although HSR provides an attractive political alternative, it should not be at the expense of reductions of investment in other parts of the rail (or transport) network. This issue was highlighted in the Cour des Comptes (2014) report on the French railways, and they have called for new HSR projects to be accompanied by greater guarantees of relevance and profitability. The Cour des Comptes (2014) also noted that the users

of HSR mainly come from the higher income groups, with users of other rail services representing a much wider range of income groups.

New approaches are needed to major project analysis that accepts the complexity of the issues that engages with all interested parties, that explicitly includes uncertainty, and that is holistic and system-wide in its scope – that would suggest a National Transport Strategy, and preferably one that embraces sustainable transport (i.e. the NSTS). At present it seems that major investment decisions are treated as being political, but even here there also needs to be long term strategic stability that can provide continuity between Parliaments. This continuity is necessary to give confidence to investors and to provide the means to have clear accountability in Parliament.

The new National Infrastructure Commission (October 2015) might provide the means to have an open and clear debate about alternative strategies that would address all forms of transport, and think strategically about longer term futures (HM Government, 2015). The acceptance that independent advice should be given on major long-term infrastructure priorities is welcome and its role has now been made a permanent executive agency (January 2017). However, even though there is a recognition of the importance of advice, it is still given on a project by project basis, and it does not address the primary issue being argued here, namely to provide a NSTS for England that can bring all the advice together into a coherent strategy. The National Infrastructure Committee may make such a move less likely.

Achieving sustainable transport in long distance travel in England is a much tougher objective than in cities where there are many attractive alternatives. Rail offers huge potential to play an important complementary role to road in a NSTS for long distance travel, but the question that has been addressed in this paper is whether HSR should play a central part in that strategy. We do not know what future generations will do with their time, or how much and where they will be travelling, or the potential for new types of activities and the untapped power of technological innovation. Within this set of choices, the role for HSR might be substantial or very limited. This does not seem to have been a debate that the great Victorian railway pioneers had and we are grateful for that, but the question still remains as to whether we should do the same now.

Acknowledgements

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