HS2: a conclusion in search of a rationale

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What is the question or questions to which HS2 is supposed to be an answer? As with a number of big and long-term projects, as one rationale collapses another is grasped in the attempt to justify doing something, rather than work out whether it is a good idea. It happens with nuclear power stations (which were once a hedge against ever rising fossil fuel prices and are now an answer to climate change), the Eurofighter (once to match the MiG Russian planes, but now argued to be a good out of areas plane). In all such cases the budgets get revised up as they go along.

When it comes to HS2, the search for a justifying rationale has gone through many episodes. Only one, the original idea, has some merit, but HS2 is no longer an answer to it.

The original idea – part of a European network

The original idea, the good one, was to integrate the UK into a European increasingly interconnected high-speed network. It would be possible to seamlessly get on a train in Edinburgh or Manchester, go past Birmingham, thought the middle of London, onto the Channel Tunnel and then through to Zurich or Frankfurt, Paris and eventually to Warsaw, Prague, Milan and Rome. This would be the single market in action, and a key bit of the European infrastructure. Being on the edge of Europe and the Eurozone, there were great benefits to be had for the UK as part of this market integration process.

To evaluate HS2 in this wider European context meant taking a *system* view of the costs and benefits of an interconnected Europe and, as with all systems, the benefits accruing to all those joined up to that system. It could be good for people in the UK cities, and those in European ones too. No one has ever done this analysis. It is a system and not a cost-benefit analysis exercise of the disaggregated benefits to the UK.

The European argument bit the dust when an early cost review worked out that about £0.5 billion could be saved out of the then total of around £50 billion if the trains stopped at Euston, and everyone got out and towed their cases down the Euston Road to Kings Cross/St Pancreas station to get on the Eurostar. Without a through connection, it was no longer a European interconnected system, but rather a purely national project. That is when things started to go wrong. Once it is only national then it is about bits of a national system, and there are lots of competing versions of this.

With probably the best rationale abandoned over a possible saving of around 1% of the total budget (and probably even less now the project costs have shot up towards perhaps £80 or even £100 billon), the Department for Transport (DfT) now needed to find a purely national justification to keep the project alive.

Three new arguments

Step forward three arguments: that the existing lines were so congested that only building new ones could match rising demand; that (high) speed saved time and hence costs; and that it would increase growth in the north and disperse economic activities more evenly between north and south and away from London.

All three rationales are open to challenge. First, it is not true that the existing lines could not be upgraded and carry more capacity. Railways are basically empty for almost all of the time, and the distance between and number of trains depends upon stations and signalling. Standing on a mainline station platform at say Didcot Parkway, staring at the empty lines, reflects the fact that for most of the time there are no trains. The London Underground, by contrast, carries trains every few minutes. Few mainlines carry trains less than 10 to 15 minutes apart. Existing lines could be upgraded, and they have the great merit of already existing and require much less extra land and demolitions that the new line must have. For £100 billion, the existing rail network could be upgraded almost everywhere, with comprehensive modern signalling, station enhancements and a coherent fibre enabled communication system to run it. What is more lots of the benefits would accrue pretty quickly whereas HS2 takes years (in fact probably close to

two decades from the start). At a positive discount rate this timing question matters. It is a comparison that should be made

Second, the equation of speed, time saved, and economic benefits featured strongly in the DfT's cost-benefit analysis and justification for the HS2 investment. But does speed really matter that much? Is time spent on a train pure economic loss as the DfT assumed? Does no work happen on trains? And if this is true and there is £100 billion to spend, could not other parts of the networks with more time lost be better invested in? For example, what about all those hapless and stressed customers on South West Trains? Many outstandingly good networks, like that in Switzerland, go for slower but run more punctual services. The variance in the arrival and departure times relative to the timetables may count for much more. The comparisons should be made between alternatives ways of saving time. Speed may save time, but not necessarily costs, and the faster the trains the more expensive HS2 becomes.

Third, connecting London faster to the north does not obviously lead to a one-way exodus from London to the north. Indeed, it makes the opposite easier and more likely. Given a commuting radius of say around 1.5 hours, by drawing Birmingham closer into the London orbit, and making the 2 hour radius much bigger, London becomes even more commutable. Far from dispersing growth to the north from the south, it could easily work the other way around. Furthermore, it is not obvious that the economic growth problem in the north is caused by lack of connection to London, or that the £100 billon spent on HS2 is the best way of increasing the northern growth rate. The reason London is different is because of its sheer size, and its role as a global hub for finance, legal, accounting and other high value services. Once plugged into the global city networks, it is hard to prise away parts of this economic model to towns on the north. It is not even necessarily desirable.

Promoting the economic growth prospects in the north is much more about connectivity *within* the north, and the educational, skills and research bases. Estimates of the economic growth value of connectivity used to justify HS2 are highly questionable. They should be revisited.

Other uses for £100 billion

If there is £100 billion to spend on infrastructure, what projects offer the best returns? This can be broken down into a series of sub-questions. First, what are the alternative options in transport? Second, what are the alternative options in infrastructure more generally? And third, what are the best economy-wide investment opportunities?

In transport, there are two main alternative options. The money could be spent on upgrading the existing rail network, with smart signalling and metering, and smart system coordination, better smarter stations, better access to stations, more and better stations, and better rail lines. It could be spent on urban transport systems, and a host of schemes for all the main cities in Britain. These would have the added benefit of reducing air pollution, (which damages the health of urban populations significantly) and improving productivity within cities. The money could be spent on roads, which is the main form of surface transport. If autonomous electric vehicles develop, controlled by smart systems, and powered by low carbon electricity generation, then roads may be better than rail in the future, having greater flexibility and able to take denser traffic. £100 billion would cover the development of a smart charging network with a lot of change to spare. Any assessment of HS2 has to show that it has benefits in excess of those alternatives, all of which are designed to improve transport outcomes.

If the counterfactual is the infrastructures more generally, then the first candidate would be fibre and broadband. This would cost less than £100 billion to complete and one of its impacts would be to reduce the need to travel and hence the demand for travel. Instead of simply assuming the future demand growth justifies HS2, it is worth considering how to avoid the additional demand in the first place. Fast digital communications would also help to foster economic growth in all parts of the UK, and connect everyone to the global economy. Yet the UK does not even have comprehensive good mobile connectivity.

There are lots of other infrastructure needs competing for Treasury funding. These include: the new decentralised electricity systems, the natural capital infrastructures to support the 25 year environment plan and its multiple economic benefits, the upgrading

of catchments, and the replacement of the sewers. Even fixing the potholes in the roads, maintaining the reservoir dams, ensuring sufficient capacity on the electricity systems to avoid power cuts, and the backlog of capital maintenance to the existing infrastructures might have higher economic returns. The comparisons should be made.

It may be that all of the above have positive net present values, but one consideration needs to be borne in mind: the government does not have unconstrained funds; the public cannot pay all the user chargers; and it is important to start with the highest value opportunities first. There is a transport total budget. Even at the (non-credible) claim that HS2 has a 2:1 benefits to cost ratio, there may be many better ways of spending £100 billon. With HS2 sucking up the transport budget, it is inevitable that other possibly better projects will lose out.

Net gain, compensation and the damage HS2 will do

HS2 is a wholly new railway line in a crowded island. It will be an immense scar across the landscape as a result, and although it will create new communities and economic opportunities, it is going to do a lot of damage to existing ones. Some natural capital assets like ancient woodlands are literally irreplaceable.

The net gain principle requires HS2 to leave the natural environment in a better state than it was before the project. This demands that irreplaceable assets must be replaced. It is a tall order. It is important not just to consider the environmental damage HS2 will cause, but also the comparator damage other transport options would have caused.

Once completed, HS2 will encourage other knock-on damage. Indeed, it is intended to do so, by increasing property and business development along the line.

The environmental assessment for HS2 is partial, incomplete and needs to be revisited.

The transport strategy within which HS2 is nested

HS2 is a systems question, and it is nested within a wider transport context. The relevant question is: what sort of systems will be required to service the economy though the middle and later part of this century?

Some of the parameters are known. There is a legal requirement to be net zero by 2050. Electric cars are already developing. We know a lot about autonomous vehicles and the supporting digital infrastructure requirements. The economy will be fibre based, houses and buildings will be smart, and people will have virtual visual and audio interconnections to anywhere in the world.

The question is whether HS2 will be the most efficient way to transport people around (it will not do much for goods). Will it for example replace domestic flights? Will aviation be constrained and have a smaller role in a net zero world?

This latter consideration has added a new and novel rationale for HS2 as part of a net zero policy. But if this were indeed true, the government would be constricting airport capacity and probably not supporting new airport runways. It would also be getting very serious about reducing transport demand and put in place the enabling infrastructures to decentralisation and local working. In a net zero world with full fibre, one question to ask is whether there will be much point in commuting.

It is hard to avoid the conclusion that the future is more likely to be cars and vehicles than trains, and that it is in the roads and the charging networks that the greatest transport requirements are set. This indeed is one of the pillars of the government's industrial strategy.

Finally, now the project is even further delayed, and for the 2030s rather than the 2020s, there is a technology question. With extremely fast technical change in transport, is it a good idea to lock in 2010s technology for mid-century transport? Any transport strategy needs to recognise technical change and build in the flexibility to cope with the uncertainty. HS2 by contrast is fixed and inflexible.

One way of putting this is: what is the transport strategy that would make HS2 a good idea? To this the government has provided no credible answer.

What we are left with

There is a case for building HS2 as part of a Europe wide high speed rail network. There is a case from a net zero perspective. But it is probably not as strong as some of the other transport and infrastructure ways of spending £100 billion.

There is a much weaker case for stopping HS2 at Euston, and hence knocking out the European interconnection benefits (including the reduction in European flights that would have followed).

There is an even weaker case for an HS2 that stops at Oak Common outside the city of London and closer to Heathrow. Repeating the exercise of cutting out the link to St Pancreas again, by saving a few billion halting the trains to the west of London would compound the earlier mistake. A classic bit of "saving" in the usual British style would make the case of HS2 even weaker.

There have been numerous reviews of the project. The steps that ought to be taken, but have not so far include the following:

1. Identify the questions to which HS2 is claimed to be an answer – list them out clearly and decide which HS2 is trying to answer.
2. Indemnity for all the other options in answering these questions.
3. Consider the other ways in which £100 billion could be spent on the existing rail, and existing transport systems, and compare the outcomes.
4. Consider how to reduce demand by accelerating broadband and fibre.
5. Re-evaluate the claimed value of time gained from speed, and set this against the more than proportional rise in costs as trains add increments of speed.
6. Consider the impacts on net zero of all the options.
7. Set out the transport policy rationale out to 2050 within which the fixed technology of HS2 is set.

Cancelling HS2 has many attractions. Building a European linked rail system also has lots of attractions. Half-baked intermediate options risk losing major gains, for the benefit of small cost savings.