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High-Speed Rail development – Securing the potential a UK (planning) perspective

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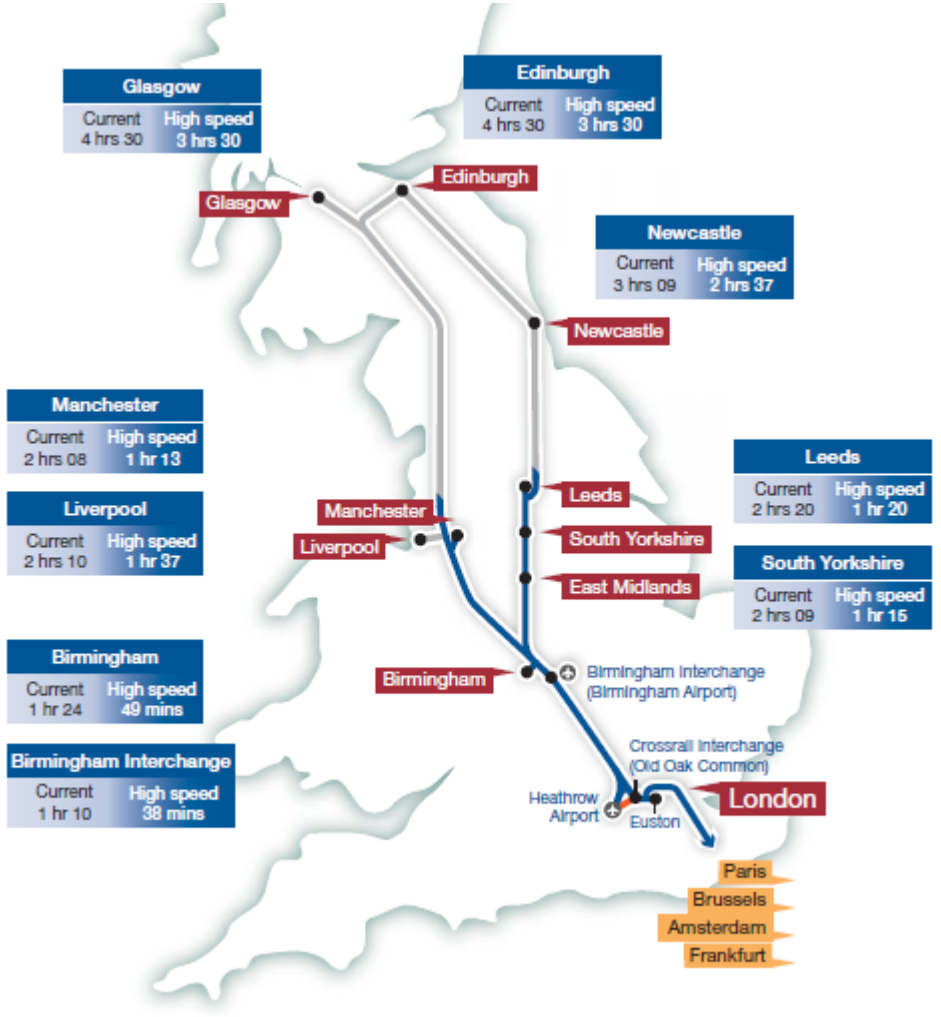
Content:

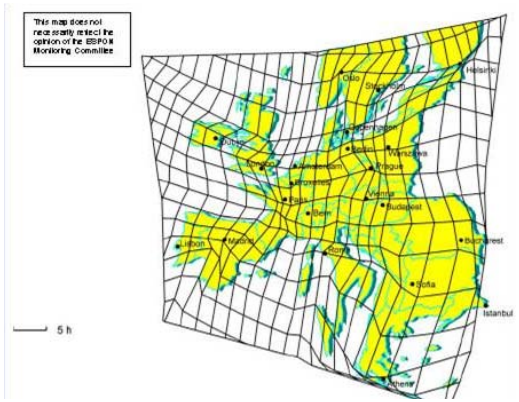
- HSR (plans) in the UK
- Accessibility and economic benefits
- Number of stations
- Station location
- Integration with the transport network
- Conclusions

Rail and HSR in the UK

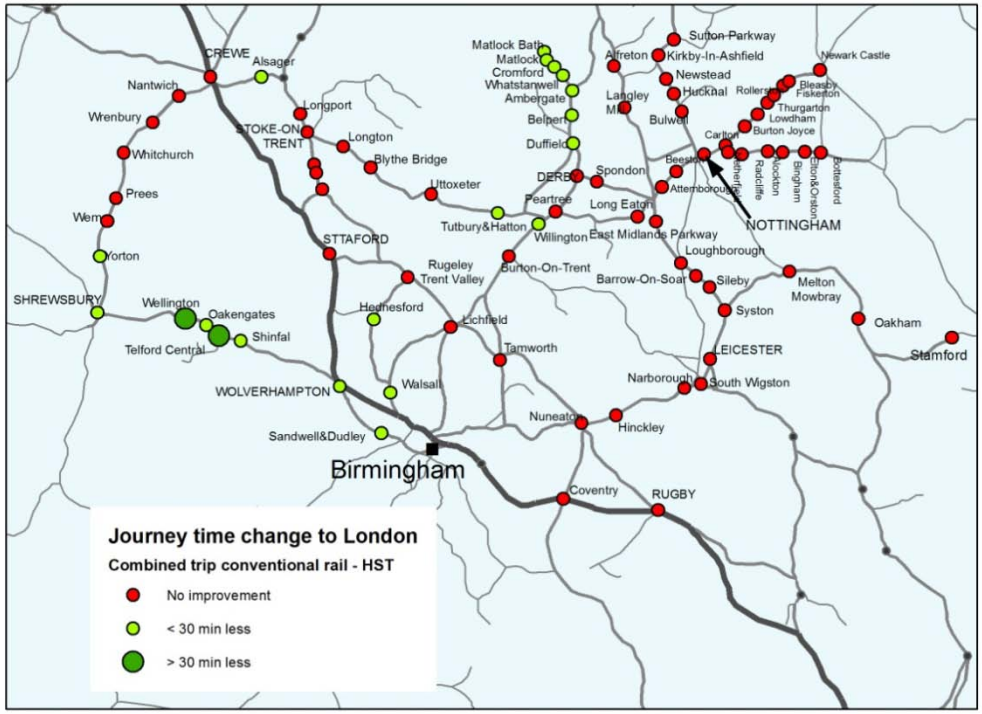


Accessibility benefits

Prerequisite for any development benefits



Birmingham station catchment area (based on Network rail proposal)

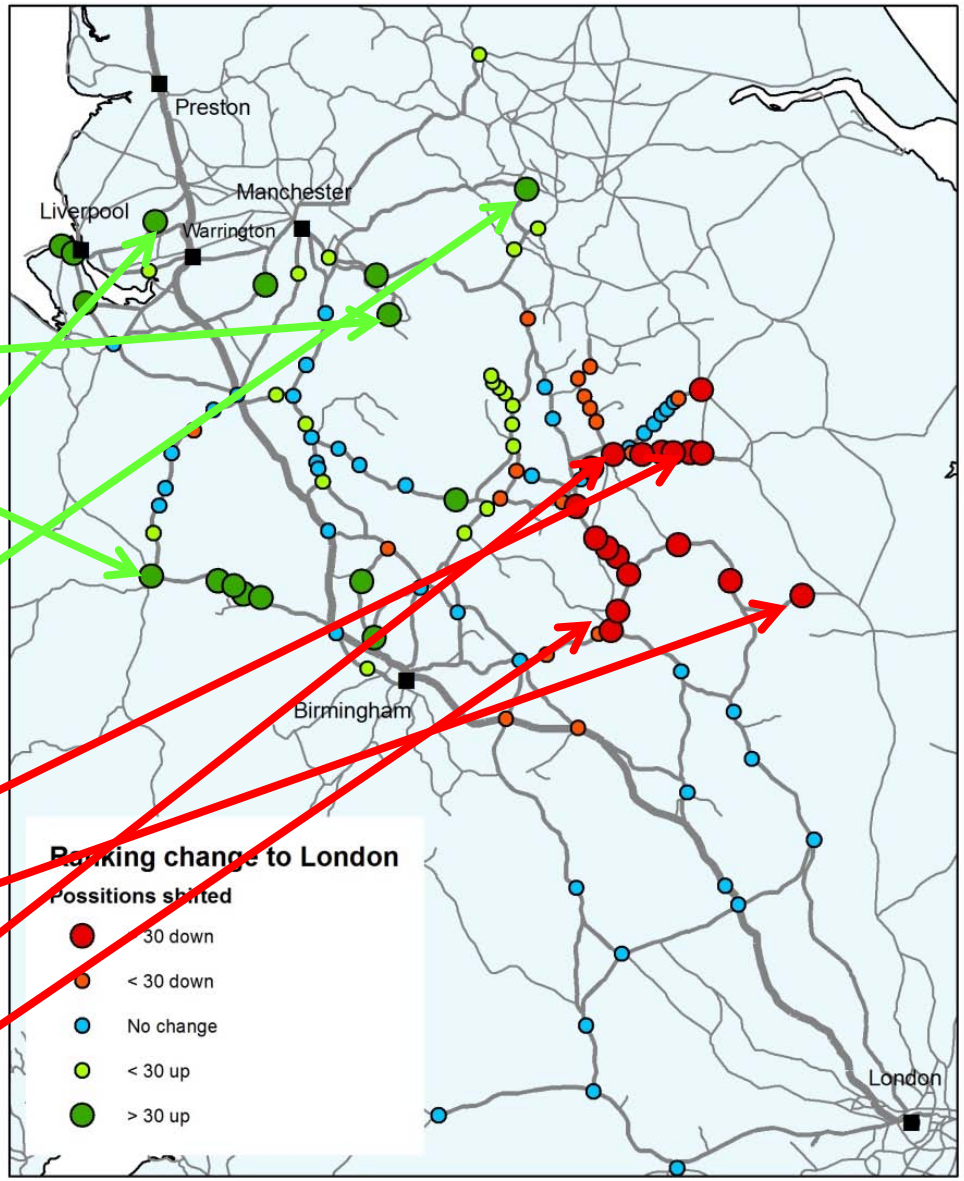


Martínez Sánchez-Mateos, H.S. and Givoni, M. (2009) available on http://www.tsu.ox.ac.uk/pubs/wpapers.html

Accessibility (dis)benefits (cont.)

Changes in accessibility (to London) ranking

	Rank before	Rank after	Rank change
BUXTON	114	35	+ 79
ST HELENS	102	30	+ 72
SHREWSBURY	99	57	+ 42
SHEFFIELD	67	37	+ 30
	Rank before	**Rank after**	**Rank change**
RADCLIFFE	31	103	-72
STAMFORD	29	94	-65
NOTTINGHAM	20	83	-63
LEICESTER	16	64	-48



Economic benefits

Transport benefits		**37.3**	
Business users	25.2		
Other users	13.1		
Wider Economic Impacts		**6.3**	
London-West midlands (Birmingham)	4		
Rest of the Y network	2.3		
Total benefits			**43.7**
Total Cost		**44.3**	
Capital cost	30.4		
Operating cost	17		
Total cost (net of revenues (27.2))			**17.1**
BCR with WEIs			**2.6**

Number of stations

A simple (economic) model:

Number of stops = f (Access 'cost', stopping 'cost')

Access cost = cost of the station + (cost of accessing the station X # passengers using the station)

Stopping cost = (additional travel time X # passengers not using the stop)

Number of HST stations

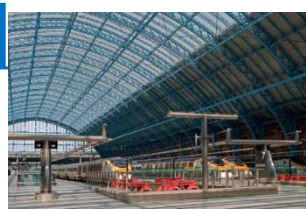
Characteristics of HST suggest very low number of stations (stations are expensive/complicated, stopping a train is 'costly', improving access 'cheaper'/easier)

To optimise HST benefits, number of stations must be minimised but their accessibility maximised.

This is achieved through:

a) Integration of HST with the rest of the transport system
b) Decision on station location

Station location: main options and implications



City centre location: Pros: highly accessible (if the land is available), large potential for commercial and real estate re-development.
Cons: costly, “complicated” and (often) restricted land for redevelopment.

City outskirts location: Pros: cheaper, simpler, better (regional) road accessibility, likely more land for (re)development, reduced need to divert the route to serve the city (saves money and time).
Cons: less accessible to the city (centre)

Serving Birmingham by HS2:
A station in the centre (spur from the main HS2) plus one at the outskirts (with an airport connation).
Can result in “best of both worlds” if city (demand) is large enough, otherwise, counterproductive as the station will “compete”

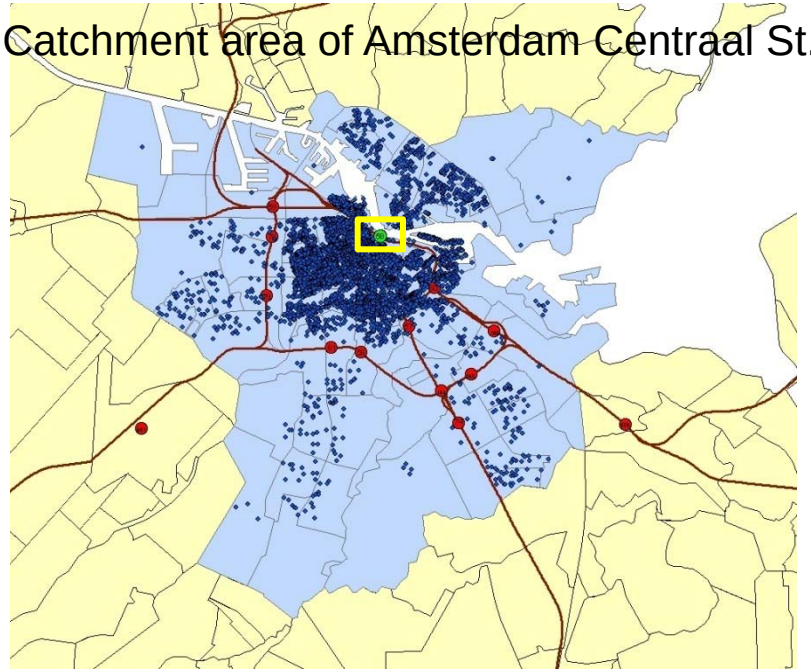
Integration with the rest of the transport network

Main determinant of accessibility, and thus the economic development benefits

Integration with urban (public) transport

The attractiveness of using HST vis a vis other modes depends on the ease to get to the station and the speed of doing so.

Catchment area of Amsterdam Centraal St.



Givoni M and Rietveld P. (2011) Access to rail in urban areas: examination of the number of stations. In Button K. and Reggiani A. (eds.) *Transportation and Economic Development Challenges*, Edward Elgar.

Economic development around station usually within 500m radius of the station – what is considered “within walking distance”. Seamless interchange between HST and local urban transport network (cycling and Public Transport) might increase this distance.

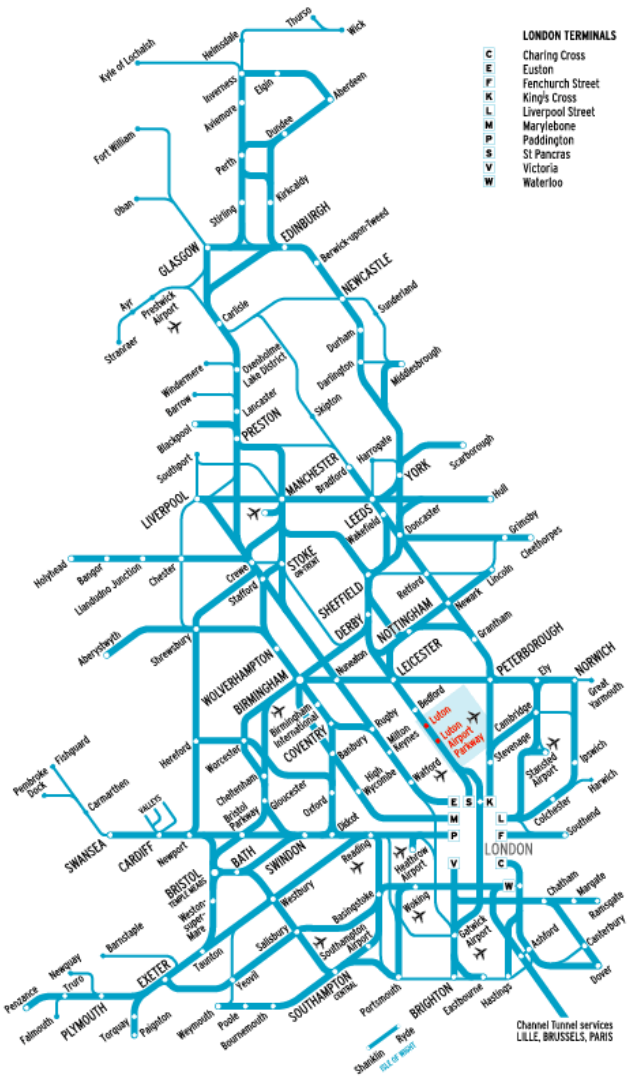
Integration with long-distance (rail) transport

Essential to spread the benefits beyond the urban area to the wider region

Risk in relaying on regional access by road

Proposed Birmingham station: a new “end of the line” station separated (walking distance) from the current two stations (New Street - currently one of the largest in the country and the centre of the network)

The map of the current rail network is missing from the HS2 debate!

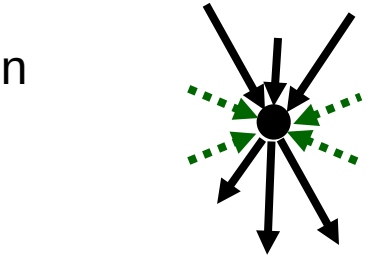


Integration with Air-Transport (=Heathrow)

Air-rail integration: a railway station can substitute and complement the runway

- Fast and seamless transfer from the aircraft to the train
- Direct and high frequency rail services to many destinations => a through station on a main line
- Travel time equal or not much slower than the flight
- The railway does not substitute the airline

Integrated-hub model



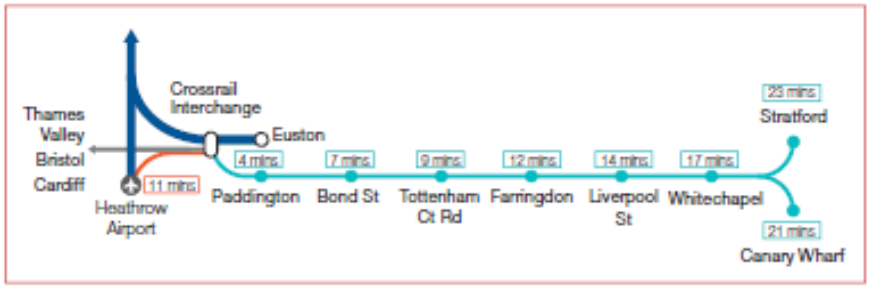
(HST) Train service
Short-haul flight
Long-haul flight

Heathrow airport

- 2nd largest in the world (2009), over 40m non-transfer passengers => from a rail perspective: “largest UK city”
- Operating at full capacity with 2 Rwys. 3rd Runway rejected for air pollution limits, now not on the agenda
- Flights that could be substituted by HST about 20% of runway capacity (2003)
- A significant contributor to the UK economy/employment. Serves less than 10 UK airports (Amsterdam over 20)

Integration with Air-Transport (cont.)

- Heathrow lacks any rail connection to outside London
- Birmingham – 2nd largest city in the UK (own airport with 8.5m pax in 2010) => from Birmingham to the world: fly to Europe or drive to Heathrow



Heathrow in HS2 plans

- Considered as part of Phase 2, a “spur” or a “loop” and not a “station on the line” the preferred option.
- A line from London to Birmingham through Heathrow: additional £2bn and 2 min. (compare with an interchange through Crossrail and a station at Birmingham airport)
- Cost of Terminal 5 at Heathrow: £4.3bn

Conclusions

HST can provide substantial accessibility benefits (which in turn might lead to economic development benefits).

These are likely to be spatially concentrated around a low number of HST stations, with many more other locations likely to disbenefit and see their relative accessibility reduced.

To secure the potential benefits of HST and to distribute them widely:

HST must be planned as the strategic backbone of the transport network, its planning must be aligned with transport policy objective and fully integrated with the existing transport network.

Two final comments:

(max) Speed is not so important – the main factor is average speed (travel time) door-to-door.

Thus,

HST must be planned door-to-door not station to station

THANK YOU

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