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Technical Note

Methodology for valuing business connectivity on the key economic corridors of the South East

The Economic Connectivity Review

1. Transport for the South East is a newly established shadow Sub-National Transport Body representing 16 Local Transport Authorities and five Local Enterprise Partnerships. Its purpose is to speak with a single voice about strategic transport priorities for the South East.

2. Transport for the South East's primary aim is to support and grow the economy in the South East by identifying and prioritising a programme of integrated strategic transport interventions. It also aims to improve the experience of the travelling public and businesses and bring about more reliable journeys free of congestion whilst safeguarding the environment.

3. The key mechanism for expressing how Transport for the South East will realise its vision and strategic priorities will be through its transport strategy, and this Economic Connectivity Review is the first stage in developing the strategy.

4. The aims of the Economic Connectivity Review are to:

   - take a strategic view and identify the economic priorities for transport in the South East;
   - make the case for investment in transport to increase productivity in the South East; and
   - be a platform for further discussions with key stakeholders in the ongoing development of the Transport Strategy.

5. The Economic Connectivity Review includes a review of the location and nature of current and future economic activity within the South East and to major centres outside of the region. This work tells us that transport connectivity supports economic growth through the following economic outcomes:

   1. **Improved business connectivity**, notably by travel time savings, improving journey time reliability;
   2. **Improved labour market efficiency**, enabling firms to access a larger labour supply, and wider employment opportunities for workers and those seeking work. Key to this is the higher capacity that transport investment can deliver;
   3. **Enabling development** through unlocking sites and locations that were previously poorly connected;
   4. **Providing access to international gateways** to increase domestic and international trade by reducing trading costs.
   5. **Supporting deprived communities** by delivering an improvement in accessibility of jobs and skills, increasing the residents of these communities' participation in the labour market.

6. This report describes the methodology for valuing the impact of improved business connectivity. The results of this analysis provide one of several metrics used to inform a multi criteria assessment framework for identifying the sequencing of the key corridors.

Analytical Approach

7. As part of Phase 1 of the Economic Connectivity Review, 35 economic hubs were identified. These are built up areas with either a resident population of more than 50,000 or employment of more than 20,000. This is used as a proxy for the quantity of high level economic activity in a contiguous urban area. Further information about the identification of these economic hubs and key corridors is provided in the Phase 1 Technical Report. These economic hubs and the corridors that link them were used as the basis for estimating the economic value of improvements to connectivity in the South East.

8. The direct effect of a transport investment is a change in accessibility, as measured by a change in the 'generalised' cost of travel which includes both monetary (fares, car parking charges etc.) and non-monetary (journey time, service frequency etc.) factors which can be observed in the transport market. Well targeted transport investments improve accessibility and make travel between different locations easier.

9. In turn, the reduction in the cost of travel acts to raise productivity, as activities can be completed with fewer resources (both time and financial). Where the cost reductions accrue to businesses this will directly impact economic performance through productivity improvements.

10. In order to understand the potential economic uplift (measured by Gross Value Added or GVA) from a transport intervention on each corridor, the value of a one-minute journey time saving on each of the key rail and road corridors has been calculated. This is dependent upon the quantity of individuals using each corridor, and the valuation those users place upon travel time savings.

11. Rail demand data has been taken from the Office of Rail and Road (ORR) Origin Destination Matrix (ODM)[1]. Equivalent data for road has been extracted from the Highways England South East Regional Transport Model (SERTM). Values of travel time savings have been taken from the Department for Transport (DfT) Transport Appraisal Guidance Databook (December 2017)[2].

Rail Analysis

Extracting Business Demand for the Study Area

12. Station to station demand data, split by ticket type and covering the period from 1st April 2016 to 31st March 2017 was extracted from the ORR ODM. In addition, information on the distance between stations was also captured. Only trips which had an origin and destination in the South East, or an origin in the South East and destination in London were extracted from the dataset.

13. While demand data is split by ticket type, the ODM does not provide any information regarding journey purpose. Therefore, in order to isolate business travel from other journey purposes, evidence regarding the proportion of total demand (split by ticket type) by journey purpose was taken from the TAG Databook (December 2017).

14. Table 1 shows how the 'Flow Categories' in the TAG Databook were matched to the ORR ticket types, and the proportion of demand for each ticket type that is considered to be travelling for business purposes. These proportions were used to calculate the quantity of business travel for each station pair.

[1] **http://orr.gov.uk/__data/assets/pdf_file/0014/26600/regional-rail-usage-odm-methodological-report-2017.pdf**

[2] **https://www.gov.uk/government/publications/webtag-tag-data-book-december-2017** Department for Transport, 2017

Table 1: Proportion of demand by ticket type and flow category travelling for business

ORR Ticket Types TAG Ticket Categories TAG Flow category description	Full and Apex Full	Reduced Reduced	Season Season
Within London Travelcard Area	11.79%	9.55%	4.83%
Rest of South East to/from London Travelcard Area	22.45%	15.72%	3.95%
Within the South East (excl. London Travelcard Area)	7.07%	5.51%	1.51%

Source: TAG Databook Table A5.3.2

15. Once the quantity of business demand for each station pair was known, this was aggregated to represent all travel between economic hub areas. For example, four stations are located within the Slough economic hub, namely Taplow, Burnham, Slough and Langley. Total business demand from the station to station origin destination demand matrix was then aggregated up to these groupings of stations to make a matrix of economic hub origin destination demand.

Assigning Values of Time

16. The aggregated origin destination matrix provides an estimate of rail business demand between economic hubs in the South East. To monetise a journey time saving of one minute between these economic hubs, this demand is multiplied by the business user value of travel time savings reported in the TAG Databook.

17. The values reported for rail business passengers are split by distance band and are presented as £ per hour in 2010 prices. As shown in Table 2 these values of time were divided by 60 to represent a value of time per minute, per passenger. Values of time were then assigned to each economic hub origin destination pair based on the longest station to station distance within the two economic hubs. For example, the value of time assigned to journeys between Slough and Reading would be based on the distance between Langley, the furthest east station in the Slough economic hub and Theale, the furthest west station in Reading economic hub.

Table 2: Rail Passenger Values of Time per Minute

Distance	£ (2010 prices)
0-50km	£0.17
50-100km	£0.27
100-200km	£0.47
200+km	£0.68

Source: TAG Databook Table A1.3.1

Assigning Corridor Values

In order to estimate the value of travel time savings for a corridor rather than between a pair of economic hubs, pairs of economic hubs were assigned to the key corridors of the South East. For example the following economic hubs were assigned to the A23-M23 / Brighton Mainline corridor: Brighton and Hove, Haywards Heath/Burgess Hill, Crawley/Gatwick, Redhill/Reigate and London. The total value of a one minute journey time saving on the corridor was then calculated by summing the monetised demand value of all the economic hub pairs on each corridor.

Highways Analysis

Extracting Business Demand for the Study Area

18. The South East Regional Transport Model (SERTM) includes highway demand data for three time periods: AM Peak, Inter Peak and PM Peak. From these matrices, demand was extracted. Demand data from SERTM is split and reported across 2,306 zones. In a similar way to the rail demand data, a correspondence between model zones and economic hub areas was generated. Model zones were then aggregated to estimate the quantity of demand between economic hubs.

Annualisation of Business Demand

19. The annual hour matrix for each time slice represents the following periods of time:

- AM Peak Period (0700-1000)
- Inter Peak Period (1000-1600)
- PM Peak Period (1600-1900)

20. To create annual values comparable to the rail demand analysis it was necessary, therefore, to annualise the data extracted from SERTM.

21. The annualisation process created a 12-hour annual average daily traffic demand figure. Overnight data was not provided from the model, which is unlikely to have an impact on the analysis of business travel but may underestimate freight demand which is often moved overnight. To obtain an annualisation factor, weekends and Bank Holidays were assumed to be equivalent to 12 hours of the Inter Peak average hour. This is shown in Table 3.

Table 3: 12 Hour Annualisation Factor

Number of Days in Year	Period	AM period (3 hours)	IP Average Hour (6 hours)	PM Average Hour (3 hours)
104	Weekend	0	2	0
8	Bank Holiday	0	2	0
253	Weekday	1	1	1
Total of each time period in a year		253	477	253
Total hours of each time period in a year (12h annualisation factor)		759	2,862	759

Source: Steer Davies Gleave

22. The annual hour matrix for each time slice was multiplied by its respective 12-hour annualisation factor, before summing across all time periods. All user classes were then summed to give a total 12-hour annual average daily traffic demand figure.

Allocating Value of Time to Highway Demand

23. As with rail, values of travel time savings for highway users are by distance band (see Table 4). The values reported within the TAG Databook were divided by 60 to represent a value of time per minute, per user.

Table 4: Highway User Values of Time per Minute (Car driver or passenger)

Distance	£ (2010 prices)
0-50km	0.17
50-100km	0.27
100-200km	0.37
200+km	0.47

24. Using Google Maps, a distance in kilometres was identified for each economic hub origin destination pair. Based on this distance each pair of economic hubs was assigned a value of time.

Assigning Corridor Values

25. Using the same corridor compositions as for the rail analysis, the total value of a one minute journey time saving on the corridor was then calculated by summing the monetised demand value of all the economic hub pairs on each corridor.

Final Results

26. The results of the analysis are shown below in Table 5. The annual business user value of a minute journey time saving on the highway is far more significant than for rail. This is a result of there being significantly higher levels of demand on roads than on rail.

27. This analysis has been used to analyse the impact of one minute journey time saving to provide an indication of the value of business demand to the economy of the South East, and for comparative purposes to contribute to corridor prioritisation. Higher GVA impacts could be delivered through better journey time improvements. For instance, a journey time improvement of 5 minutes on the A23-M23 / Brighton Mainline corridor would add more than £20 million to the economy.

Table 5: Single year business user value of one-minute journey time saving (£/min, 2010 prices)

Corridor	Highway	Rail
A23-M23 / Brighton Mainline	£3,913,000	£600,900
A3/Portsmouth Direct Line	£3,745,000	£310,600
M4 Great Western Mainline	£3,099,000	£229,900
A2/M2 Chatham Mainline	£3,065,000	£204,900
M3/South Western Mainline	£2,813,000	£195,200
M20-A20/HS1	£2,350,000	£131,800
A27/West and East Coastway Line	£2,230,000	£70,800
M27/West Coastway Line and South Western Mainline	£1,096,000	£67,300
A22/Brighton Mainline and East Coastway Line	£696,000	£13,000
A259 East Coastway Line	£487,000	£5,900
A21/Hastings Line	£470,000	£4,700
Guildford-Reading/North Downs Line	£423,000	£4,400
A33	£255,000	£4,400
A229/Medway Valley Line	£249,000	£2,700
A322/Waterloo to Reading Line and North Downs Line	£195,000	£2,600
A264/Arun Valley Line	£188,000	£2,000
A34	£169,000	£1,000
M25	£125,000	£900
A299/Chatham-Ramsgate Mainline	£122,000	£700
Herne Bay - Whitstable to Canterbury	£118,000	£400
A303/West of England Mainline	£57,000	£100
A25/North Downs Line	£17,000	£100
Redhill-Ashford	£1,000	£100

Source: Steer Davies Gleave