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This submission is concerned with the economic benefits of investment in smart motorways. **My conclusion** is that there is much less benefit in adding capacity than has been forecast on account of the diversion of local trips onto the motorway, which negates the projected benefits to long distance users.

I have carried out a detailed analysis of the outcome of a smart motorway investment and have compared with this the forecast benefits predicted by the traffic and economic modelling commissioned by Highways England.[1]

In summary, the London orbital M25 was widened in 2015 from three to four lanes in each direction between junctions 23 and 27, part of the Smart Motorway programme of Highways England, with detailed monitoring of traffic flows before and for the first three years after opening. Some initial speeding up of traffic was observed at the first year after opening, but this gain was lost by year two on account of the increase in traffic volume. By the third year after opening the growth of average daily traffic of 16% was substantially greater than on major roads in the region (7%) and greater than forecast in the transport modelling used to justify the investment.

The model predicted a significant increase in traffic speed, which generated travel time savings that contributed to a benefit-cost ratio (BCR) of 2.9, representing high value for money according to the Department for Transport's categorisation. However, these time savings were not observed beyond the first year.

The model forecast substantial time saving benefits to business users. There were also time saving benefits projected for local users, commuters and others, but these were almost entirely offset by increased vehicle operating costs, reflecting diversion to somewhat longer routes to take advantage of the faster travel possible on the widened motorway.

As noted, the model under-predicted the increase in traffic flows as a result of the investment. It is likely that much of the additional traffic observed above forecast arises from local users rerouting between unchanged origins and destinations to take advantage of shorter journey times via the motorway, while incurring greater fuel costs. Such longer trips give rise to increased negative externalities, including carbon emissions, air pollutants etc, which are

set against the user benefits. The outturn BCR must therefore be quite small, possibly even negative.

This M25 case is likely to be representative of much planned investment in new capacity on the Strategic Road Network, which comes under greatest stress in or near urban centres where local traffic competes for carriageway with the long-distance users for whose benefit the investment is primarily intended. Rerouting to take advantage of new capacity is facilitated by the widespread use digital navigation (satnav) devices that offer routes with the shortest journey time. Highways England includes 10 smart motorway investments in its current five-year investment programme with a forecast average BCR of 2.4.[2] This seems very optimistic.

Optimism bias is likely to apply also to the other major enhancements in the programme, which comprise junction improvements, widening and bypasses, with BCRs in the range 1-9 – 2.4. The problem is two-fold:

- Inability to prevent local users from taking advantage of the increased capacity of the Strategic Road Network, thus negating the intended benefits to business users.
- Inadequacy of traffic monitoring as a means of evaluating the benefits experienced by different classes of road user.

Effective evaluation of the outcome of road investments requires monitoring of how the travel behaviour of different classes of road users changes over time as a result of the increase in capacity. Such longitudinal studies are standard techniques in the health and social sciences, but have not been applied to travel behaviour.

Conclusion

Available evidence suggests that investment in smart motorways fails to deliver the economic benefits predicted.

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Endnotes

[1] Metz, D. (2021) Economic benefits of road widening: Discrepancy between outturn and forecast. *Transportation Research Part A,* 147, 312-319.

[2] Highways England. Economic analysis of the second road period. July 2020.