

Induced traffic: Why road expansions, despite large investments, do not solve traffic congestion

Aljaž Plevnik, Tom Rye, Luka Mladenovič, Mojca Balant, Andraž Hudoklin

Transformative Transport Planning Research Group, Urban Planning Institute of the Republic of Slovenia

Experience shows that the construction of new roads and the expansion of existing ones encourage drivers to make new car journeys that would not have occurred without these measures. Most of these new trips result from increasing road capacity in urban areas and on congested sections of long-distance roads - precisely where congestion is already a problem. These additional trips (which are often neither planned nor anticipated) result in new congestion - within two to five years after the opening of a new or improved road, congestion levels typically return, nullifying the intended benefits. Due to induced traffic, solving congestion by increasing road capacity is both ineffective and economically unsound. A recent review of 545 road projects in urban areas across Europe highlights the high level of induced traffic.¹

New road infrastructure is expensive, yet its benefits are largely negated by induced traffic, whilst at the same time this traffic makes the achievement of targets for reduced CO2 emissions impossible to achieve in the planned timescale. Therefore, all plans for new road construction or expansion requires, beforehand, an objective evaluation of experiences and outcomes in cities and regions where such measures have already been implemented. The findings regarding induced traffic, summarized from available literature, are presented below.

What is induced traffic, and what causes it?

Induced traffic refers to traffic that is attracted to an improved road and which would not have existed without the improvement. It is a fundamental result of the economics of supply and demand: as the "price" (travel time) decreases, the "demand" (the number and length of car trips) increases.² In the short term, better roads lead people to travel more frequently by car, visit more destinations, or travel longer distances. In the longer term, a new or improved road makes certain locations more accessible than they were before. This encourages new developments (mainly residential and commercial buildings), which result in further induced traffic.³ This phenomenon is not confined to the new or improved road itself - it occurs throughout the entire corridor and is not accompanied by reduced traffic on parallel roads.⁴ Induced traffic is generally smaller in areas where good alternatives to car use exist (such as railways or trams) and/or where road usage is subject to tolls.¹

Does road expansion reduce congestion?

Due to the phenomenon of induced traffic, road expansion typically does not reduce congestion, either in urban areas or on roads that are already overloaded. *Goodwin* reviewed numerous projects and found that new road projects, on average, induce 10 - 20% more traffic than was present on the network before the project.⁵ This average varies by location and project, with significantly higher values often observed on already congested sections.²

It is important to note that even a small percentage of induced traffic can easily cause congestion on sections where the road network is already nearly full. The opposite effect can be seen on roads during school holidays when even a slight reduction in traffic leads to a significant decrease in congestion. As a result, it can be expected that new road projects, especially in areas where congestion already exists, will generate enough induced traffic for congestion to quickly return, and eventually worsen.

Numerous studies of road projects in metropolitan areas in the United States have shown that traffic demand increases at the same rate as capacity, with induced traffic filling the new road space in about five years.^{4, 6, 7, 8} A recent review of road projects in 545 urban regions in Europe, conducted by *García-López* and colleagues, found an even higher rate of induced traffic on average.¹ However, they also found that the extent of induced traffic in European cities with efficient urban public transport or regional rail systems, along with competitive alternatives to car travel, is about half that observed in the United States.

What are the effects of induced traffic?

When induced traffic leads to greater road congestion and burdens than anticipated, it means that the benefits of the road project are smaller than originally predicted.⁹ "Increased road capacity raises the number of vehicle kilometres travelled to the extent that it outweighs the potential short-term reduction in congestion it was expected to bring."¹⁰ Induced traffic

can also make public transport less effective, as a new or improved road attracts some new drivers who previously used public transport.¹¹ Extensive evidence further confirms that road construction in urban areas leads to suburbanization and urban sprawl. This results in increased car traffic, even among those who might not prefer a car-dependent lifestyle.¹³ However, there is evidence that in countries with effective spatial planning policies, such as the Netherlands, it is possible to reduce the spread of suburbanization and the associated traffic.¹²

Conclusion

Due to induced traffic, road expansion does not solve congestion problems, making it necessary to focus on alternative measures. These primarily include demand management strategies, such as road usage charges based on actual use, parking fees, spatial planning policies that reduce urban sprawl, and measures to improve alternatives to cars. Such alternatives include better public transport, dedicated lanes for high-occupancy vehicles, and expanded cycling networks.¹³

Sources

¹ Garcia-López, M. À., Pasidis, I., and Viladecans-Marsal, E. (2022). Congestion in highways when tolls and railroads matter: evidence from European cities. *Journal of Economic Geography*, 22(5), 931-960.

² Dunkerley, F., Laird, J., and Whittaker, B. (2018). Latest evidence on induced travel demand: An evidence review. Report to Department for Transport, London, UK.

³ Cervero, R. (2003). Road expansion, urban growth, and induced travel: A path analysis. *Journal of the American Planning Association*, 69(2), 145-163.

⁴ Handy, S. (2015). Increasing highway capacity unlikely to relieve traffic congestion. UC Davis Policy Brief.

⁵ Goodwin, P. B. (1996). Empirical evidence on induced traffic: A review and synthesis. *Transportation*, 23, 35-54.

⁶ Duranton, G., and Turner, M. A. (2011). The fundamental law of road congestion: Evidence from US cities. *American Economic Review*, 101(6), 2616-2652.

⁷ Hymel, K. (2019). If you build it, they will drive: Measuring induced demand for vehicle travel in urban areas. *Transport policy*, 76, 57-66.

⁸ Noland, R. B., and Lem, L. L. (2002). A review of the evidence for induced travel and changes in transportation and environmental policy in the US and the UK. *Transportation Research Part D: Transport and Environment*, 7(1), 1-26.

⁹ Mackie, P. J. (1996). Induced traffic and economic appraisal. *Transportation*, 23, 103-119.

¹⁰ Noland, R. B. (2001). Relationships between highway capacity and induced vehicle travel. *Transportation Research Part A: Policy and Practice*, 35(1), 47-72.

¹¹ Arnott, R., and Small, K. (1994). The economics of traffic congestion. *American scientist*, 82(5), 446-455.

¹² Levkovich, O., Rouwendal, J., and van Ommeren, J. (2020). The impact of highways on population redistribution: the role of land development restrictions. *Journal of Economic Geography*, 20(3), 783-808.

¹³ Litman, T. (2023). Generated traffic and induced travel. Canada: Victoria Transport Policy Institute.