Millions of dollars saved when scheduled travel providers adapt to on-demand scheduling

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Uber and Lyft are popular on-demand ways to travel, but does that mean trains and busses are a thing of the past? Travelers prefer different

modes of transportation at different times. So how can all these modes co-exist and do so successfully? New research in the INFORMS journal *Transportation Science* has created a model and an algorithm to redistribute transit resources based on commuter preferences resulting in millions in savings.

"Based on case study experiments in New York City, our optimized transit schedules consistently lead to 0.4%-3% system-wide cost reduction. This amounts to rush hour savings of millions of dollars per day, while simultaneously reducing costs to passengers and transportation service providers," said Vikrant Vaze of Dartmouth College.

"Transit Planning Optimization under Ride-hailing Competition and Traffic Congestion," was written by Vaze alongside Keji Wei also of Dartmouth, as well as Alexandre Jacquillat of the Massachusetts Institute of Technology.

This study attempts to understand what would happen if a public transit agency were to explicitly consider commuter choice factors and what that would do to the commute when designing their schedules.

Commuters choose modes of transportation based on travel convenience, prices, travel times and traffic congestion. The authors have found that the opposite is also true—their choice in turn changes the traffic patterns and travel times.

The authors note that by considering both of these points, they can come up with a better alignment of available transportation options with passengers' preferences in mind—by redistributing public transit resources where they provide the strongest societal benefits.

"In the interest of the overall urban ecosystem, a transit operator should

critically assess what kinds of trips and travel needs transit is better equipped to serve and at the same time, what are some of the areas where it might be better to cut down and let on-demand operators take up a larger proportion of trips. Such thoughtful reconfiguration can benefit diverse stakeholders simultaneously," continued Vaze, a professor in the Thayer School of Engineering at Dartmouth. "What we found is that this leads to schedules that are better for passengers, better for transportation operators and better for the city as a whole, a rare win-win-win."

More information: Keji Wei et al, Transit Planning Optimization Under Ride-Hailing Competition and Traffic Congestion, *Transportation Science* (2021). DOI: 10.1287/trsc.2021.1068

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