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Research Results

Simulation of Ridesourcing Using Agent-Based Demand and Supply Regional Models:Potential Market Demand for First-Mile Transit Travel and Reduction in Vehicle Miles Traveled in the San Francisco Bay Area (MAP 21)

Potential Market Demand for First Mile Transit Travel and Reduction in Vehicle Miles Traveled in the San Francisco Bay Area

Transportation Safety and Mobility

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Project Title:
Simulation of Ride sourcing Using Agent-Based Demand and Supply Models Regional: Potential Market Demand for First Mile Transit Travel and Reduction in Vehicle Miles Traveled in the San Francisco Bay Area

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WHAT WAS THE NEED?

It is well known that, on average, travelers will not walk more than a quarter mile to a transit station and that bus service to the nearest transit station is often too costly to provide or too slow to ride. Parking at transit stations is typically an expensive short-term fix because, over-time parking lots fill up with commuters early in the morning (sometimes as early as 6:30 am). Moreover, parking structures are expensive to construct and large parking lots can increase the distance to walk to transit. Both use valuable land that could be converted to residential and business uses, which in turn, could generate increased transit ridership. The failure to optimally use transit undermines sustainable operating revenue and increases both congestion and greenhouse gas emissions.

The rise of transportation network companies (TNCs), such as Uber and Lyft, presents a new opportunity for transit agencies to bridge the first and last mile to high quality transit. Within the last year, transit agencies have piloted limited projects to test the concept in at least nine cities across the U.S. Most of these pilots use more flexible state and local funds, but in the spring of 2016, the Federal Transit Administration released a request for proposals (Mobility on Demand Sandbox or MOD) to fund expanded testing of public partnerships with TNCs. Almost eight million in Federal transit funds awarded to transit agencies in California, Washington State, Oregon, Florida, Illinois, Texas, and Arizona to test different public private models to increase access to transit.

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WHAT WAS OUR GOAL?

The goal of this study was to demonstrate how available modeling tools and data can be applied to understand the potential market demand for a "first" mile transit access service and possible reductions in vehicle miles traveled (and thus GHGs) at both the regional and station level in the San Francisco Bay Area.

WHAT DID WE DO?

The research team developed a project scenario that targets commuters who drive alone but could take rail (Bay Area Rapid Transit - BART) to work. They used travel time, cost, and distance data from San Francisco Bay Area travel models, Google and BART APIs (Application Programming Interfaces), and TNC pricing structures to explore the magnitude of change in overall travel time and cost for travelers who switch from driving alone to TNC and BART. Equity effects were also explored by examining results by household income and auto availability categories.

WHAT WAS THE OUTCOME?

The analysis indicates that 31% of the identified drive alone trips could reduce generalized costs (travel time and monetary costs) by switching to TNC and BART. If all travelers who could benefit from traveling by TNC and BART, did in fact switch from drive alone travel, about 40 thousand new BART trips could be generated and over a half a million miles of VMT (Vehicle Miles Traveled) avoided during the morning commute period. Most of these trips experienced relatively high levels of cost and VMT savings, which may be more likely to motivate behavioral change. Examination of cost savings by income level and vehicle availability suggests that the new service is more likely to benefit lower income households with fewer vehicles. Sensitivity analyses indicate that even with increased TNC fares and waiting times, there is still a relatively large number of trips that could benefit from switching from driving to TNC and BART. Tests of a shared TNC BART access service suggest cost savings and VMT reductions even when travel time costs increase by 60 percent.

WHAT IS THE BENEFIT?

The study also demonstrates a practical method, using existing models and data, to identify promising early pilots of first mile TNC transit access. Analysis of benefits by station indicate locations with relatively high market potential (i.e., trips and cost saving) and environmental benefits (VMT reduction) for early pilot implementation. The results of this method can be used to estimate potential TNC fare subsidies to increase performance by station to achieve project objectives, such as equitable access, increased BART ridership, and reduced VMT.

LEARN MORE

https://ncst.ucdavis.edu/wp-content/uploads/2015/09/NCST-Rodier-Ridesourcing-Simulation-Final-June-2017.pdf

IMAGE

Image 1

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