

UC Office of the President

Policy Briefs

Title

Drivers of Partially Automated Vehicles are Making More Trips and Traveling Longer Distances

Permalink

<https://escholarship.org/uc/item/1m2917dq>

Author

Hardman, Scott, PhD

Publication Date

2020-05-01

Drivers of Partially Automated Vehicles are Making More Trips and Traveling Longer Distances

Scott Hardman, Ph.D.

Institute of Transportation Studies, University of California, Davis

May 2020

Issue

Consumers are purchasing and using partially automated vehicles, yet little research has been conducted to understand how and if these vehicles are changing travel behavior. Fully automated, or driverless, vehicles are receiving much more research and policy attention but are still many years from market introduction. Research on fully automated vehicles has shown that, without proper policies in place, these vehicles could increase vehicle miles travelled (VMT).

Tesla vehicle models with the 'Autopilot' feature are some of the most common partially automated vehicles on the road today. A partially automated vehicle provides advanced driver assistance by controlling steering, acceleration/deceleration, and braking; however, the human driver is still considered to be in control of the vehicle and is expected to be attentive.

A previous UC Davis study found that Tesla vehicle owners with the Autopilot feature drove more than those without Autopilot, but the study did not determine whether higher VMT was caused by Autopilot. To better understand whether Autopilot influences how much individuals drive, the UC Davis research team interviewed 36 Tesla Autopilot users to evaluate whether they experienced changes to their travel, and the reasons for any reported changes. Key findings from the interviews are presented in this brief.

Key Research Findings

Partial automation could increase VMT. Reported changes to travel were not planned prior to adopting a partially automated vehicle; they appear to be a result of Autopilot and the reduced running costs of an electric vehicle.

The reasons provided by Tesla Autopilot users for changes to travel are similar to reasons detected in studies of fully automated/driverless vehicles. Table 1 compares the results from the interviews with Tesla drivers conducted by UC Davis with results from the literature on travel behavior changes in driverless vehicles.

Tesla drivers report positive experiences using Autopilot. Interviewees reported that Autopilot substantially reduces the mental load required for driving, with some comparing their experience to sitting on a bus or a train. Other core benefits of using Autopilot include feeling less stressed, less tired, more comfortable, and safer. Drivers also expressed that Autopilot is particularly beneficial on long trips (which can be tiring) and in stop and go traffic (which can be stressful).

"I don't care if the car's stopping every five feet for the next 30 minutes, because I'll sit there, I'll look at my phone, I'll text someone, or email, or listen to music." Interviewee 5

Autopilot users reported taking more trips, choosing to drive rather than fly for longer trips, and being more willing to drive in stop-and-go traffic. The reasons for

Table 1. Comparisons of VMT and travel behavior changes seen in driverless vehicle studies and changes observed in the Tesla Autopilot user interviews.

Potential changes to travel behavior	Changes expected from driverless vehicles (from published studies)	Changes seen in partially automated vehicles (in this study)
More long trips	✓	✓
More local trips	✓	✓
Mode shift from airlines	✓	✓
Residential location change	✓	?
Workplace location change	✓	?
Empty vehicle miles—errands	✓	Not Applicable
Empty vehicle miles—relocation of a shared vehicle to the next user	✓	Not Applicable

A green check mark indicates that this has been reported, a question mark indicates evidence for the change was not conclusive but could not be ruled out. 'Not applicable' refers to these not being possible in a partially automated vehicle as a driver is required to be in the vehicle.

these changes were increased comfort and reduced stress while using autopilot.

“I’d go to see my family in Oregon, and I’d fly up at least once a month, but now I drive that—just hit Autopilot. So yeah, I haven’t flown in a year, I used to fly pretty regularly, but now I don’t have to.” Interviewee 23 (from the San Francisco Bay Area)

Autopilot is a substantial contributor to drivers travelling more but not the only reason. Interviewees who reported changes in their travel also pointed to the vehicle’s comfort (e.g., lower noise, fewer vibrations, and increased smoothness), and the lower operating costs for battery electric vehicles (which included free charging from Tesla superchargers for some interviewees). However, more interviewees attributed the change in their travel to Autopilot than to these other factors.

“I think the Autopilot impact is probably like, I don’t know, between 30% and 40%. It’s significant. It’s not everything, but it’s pretty significant. It’s the biggest single ingredient I would say.” Interviewee 28

Policy Implications

A large number of partially automated vehicles could cause a system-wide increase in VMT. In addition, partially automated electric vehicles will have implications for road and infrastructure funding, and possibly congestion and vehicular emissions. Currently no policy mechanism exists to curb VMT increases from partially automated vehicles. One such mechanism could be a road-user charge where drivers pay per mile driven. More research is needed to understand the impact partially automated vehicles have on travel behavior, especially since these vehicles are already in use.

More Information

This policy brief is drawn from the UC ITS report “A Qualitative Investigation into Why Partially Automated Vehicles May Increase Vehicle Miles Travelled”. The report is available at: www.ucits.org/research-project/2019-04. For more information about the findings presented in this brief, please contact Scott Hardman at shardman@ucdavis.edu.

Research presented in this policy brief was made possible through funding received by the University of California Institute of Transportation Studies (UC ITS) from the State of California through the Public Transportation Account and the Road Repair and Accountability Act of 2017 (Senate Bill 1). The UC ITS is a network of faculty, research and administrative staff, and students dedicated to advancing the state of the art in transportation engineering, planning, and policy for the people of California. Established by the Legislature in 1947, the UC ITS has branches at UC Berkeley, UC Davis, UC Irvine, and UCLA.

Project ID UC-ITS-2019-04 | DOI: 10.7922/G2862DQ0