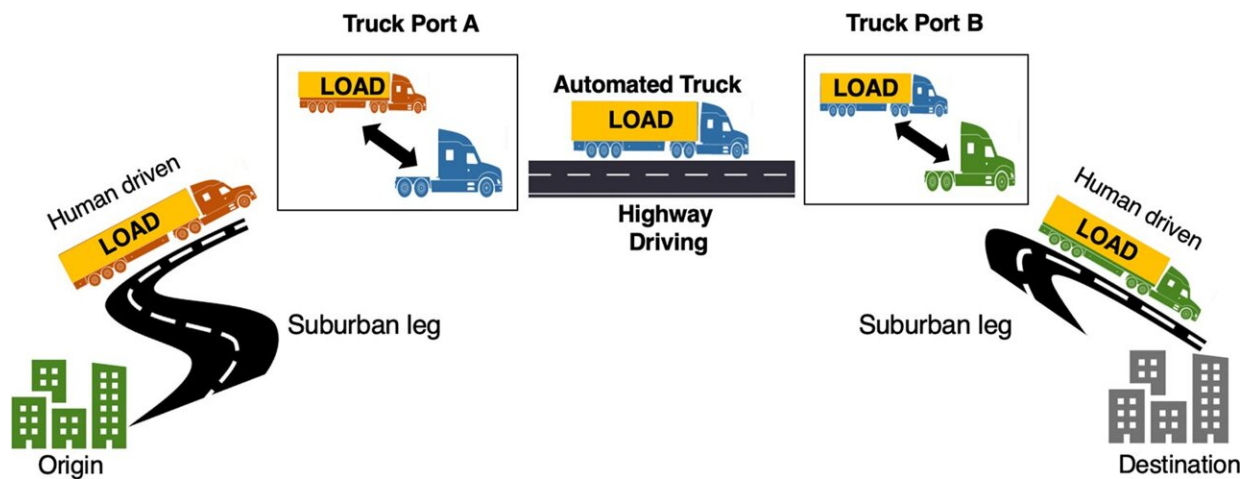


New study assesses the impact of automation on long-haul trucking

March 15 2022, by Lori Atherton



Schematic showing the possible operation of a transfer-hub model where a human driven truck drives the load from the origin to the first truck port where the load is switched to an automated prime mover shown in black. Credit: *Humanities and Social Sciences Communications* (2022). DOI: [10.1057/s41599-022-01103-w](https://doi.org/10.1057/s41599-022-01103-w)

As automated truck technology continues to be developed in the United States, there are still many questions about how the technology will be deployed and what its potential impacts will be on the long-haul trucking market.

A new study by researchers at the University of Michigan and Carnegie

Mellon University assessed how and where automation might replace operator hours in long-haul trucking.

They found that up to 94% of operator hours may be impacted if automated trucking [technology](#) improves to operate in all [weather conditions](#) across the continental United States. Currently, automated trucking is being tested mainly in the Sun Belt.

"Our results suggest that the impacts of automation may not happen all at once. If automation is restricted to Sun Belt states (including Florida, Texas and Arizona)—because the technology may not initially work well in rough weather—about 10% of the operator hours will be affected," said study co-author Parth Vaishnav, assistant professor of sustainable systems at the U-M School for Environment and Sustainability.

Using transportation data from the 2017 Commodity Flow Survey, which is produced by the U.S. Bureau of Transportation Statistics, U.S. Census Bureau and U.S. Department of Commerce, the study authors gathered information on trucking shipments and the operator hours used to fulfill those shipments.

In addition, they explored different automated trucking deployment scenarios, including deployment in southern, sunny states; deployment in spring and summer months (April 1 to Sept. 30); deployment for journeys more than 500 miles; and deployment across the United States.

"Our study is the first to combine a geospatial analysis based on shipment data with an explicit consideration of the specific capabilities of automation and how those might evolve over time," said co-author Aniruddh Mohan, a doctoral candidate in engineering and [public policy](#) at Carnegie Mellon.

The study was published online March 15 in the journal *Humanities and*

Social Sciences Communications.

Long-haul trucking is generally defined as transport that covers more than 150 miles. Several companies are currently working on developing automation for long-haul trucking that is designed to work as a "transfer hub" model.

It would involve an automated truck completing the highway leg of the route and human drivers undertaking the more complex suburban-urban segments at both the starting and end points of the journey. Truck ports near highways would be used to switch out the trailer from the prime mover and enable this switch at both ends.

Labor accounts for about two-fifths of the cost of trucking, so deploying automated technology will be seen as an attractive option for trucking companies to save money, said Vaishnav. However, there are concerns about the potential job losses for workers.

"Because trucking is viewed as one of the few jobs that give folks with a [high school education](#) the chance to make a decent living, there is a concern that automation will eliminate these jobs," he said. "Some people worry that all or most of the million or more trucking jobs might be lost.

"In terms of numbers, our analysis showed that automation could eliminate a few hundred thousand jobs (as opposed to a million or more), but there is plenty of evidence to suggest that for most people these are fleeting, poorly paid and unpleasant jobs. We think that it is possible that the number of operator hours lost at truck stops, because automated trucks will have no drivers who need to be served at truck stops, could be compensated by new employment opportunities at transfer hub ports."

The researchers also analyzed if automated trucking could lead to an increase in short-haul driving jobs, which involve transporting shipments within a 150-mile radius, and determined that the operator hours of work lost to the automation of long-haul trucking would not be made up both in terms of quantity and quality by short-haul driving work. Short-haul jobs typically pay less than long-haul jobs, the study noted, creating the potential for a reduced livelihood for workers.

"We found that an increase in short-haul operation is unlikely to compensate for the loss in long-haul operator-hours, despite public claims to this effect by the developers of the technology," Vaishnav said. "As a result of these conflicting claims, as well as the uncertainty over the technology itself and its limitations, there is little clarity on how automated trucking will be deployed and its economic and political ramifications, such as the impact on the long-haul trucking labor market. We hope to help resolve these controversies."

As part of their study, the researchers conducted interviews with trucking industry stakeholders, including tractor-trailer operators, to determine the feasibility of automated trucking deployment.

"A key finding was just how economically attractive this technology would be and the fact that everyone, including truckers, agreed that the interstate part of the job could be automated," Vaishnav said.

"Ultimately, societal and political choices can determine the mode of deployment of automated trucking capabilities, as well as the winners and losers of any shift to [automation](#) of long-haul trucking."

More information: Aniruddh Mohan et al, Impact of automation on long haul trucking operator-hours in the United States, *Humanities and Social Sciences Communications* (2022). [DOI: 10.1057/s41599-022-01103-w](https://doi.org/10.1057/s41599-022-01103-w)

Provided by University of Michigan

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