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JOURNAL REPORTS: LEADERSHIP

How Technology Can Eliminate Traffic Congestion

Variable pricing has long been touted as a miracle cure for backups. Now we have the tools to make it happen.



With apps, GPS and other tools, roadway officials can track traffic and set prices in real time, and pass the information to drivers to let them make informed choices. PHOTO: PETER FOLEY/BLOOMBERG NEWS

By Peter Cramton and R. Richard Geddes

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For years, we economists have claimed to have a miracle cure for heavy traffic. It's "congestion pricing": Charge drivers more to use roads and bridges during the busiest times, and clogged roadways will clear up overnight.

Now, at last, technology can make that miracle a reality.

With apps, GPS and other tools, roadway officials can track traffic and set prices in real time. Then drivers will get updates about traffic conditions and costs—letting them decide as they travel if they want to pay more to take a crowded road or pay less to use an emptier one.

But keeping traffic moving smoothly day to day is just one benefit of this system. Congestion pricing will enhance safety by making sure cars aren't closely bunched in stop-and-go traffic. It will reduce the need for new roads, by using existing ones to their fullest capacity. And, as dynamic pricing has done in other industries, it will raise enough revenue to modernize decaying infrastructure.

Reducing congestion is urgent because, as things stand, it imposes massive costs—in air pollution and wasted fuel, for instance, not to mention wasted time and frustration. Traffic jams cost \$23.3 billion a year in Los Angeles alone, according to an analysis by the Centre for Economics and Business Research, an economics consulting firm. The cost of congestion will rise as the population and number of vehicles on the road grows in coming years.

Managing a problem by congestion pricing isn't a novel idea. For example, wholesale electricity markets have been dynamically priced for more than a decade, charging

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higher rates at times of peak demand. But efficient road-use pricing has become feasible only recently, as advances in mobile communications now make it possible to identify and communicate the location of a vehicle with great accuracy.

How would the system work? The price of a given route would vary in real time depending on current demand and supply—increasing, for instance, if a lane was closed for repairs or an accident. In uncongested times and locations, motorists would pay only a nominal fee, to recover operating and maintenance costs. The costs would apply to all roads, not just those with tolls, and would likely be collected through a monthly credit-card charge.

Drivers would receive the price information in real time—perhaps every five minutes—through an app in their car or smartphone, to make their driving choice. It's similar to how Google Maps presents people with real-time driving information, and then they decide how to use it.

Drivers could lock in that low price for their trip or take their chances of paying more or less along the way, depending on how congestion turns out to be. So, if they must be at an urgent meeting, then they would tell the system to take the fastest route regardless of cost, based on fluctuating conditions along the way. If they weren't in a rush, they might tell it to choose the lowest-cost route regardless of how long it takes.

Real-time road prices would also allow the motorist to properly schedule travel. If they discovered after several days that waiting 15 minutes to leave for work would save money, then a few minutes of properly scheduled work at home may pay handsome dividends, both to the driver and to others who want a less-crowded roadway.

This system will also have a big impact on driverless vehicles when they eventually reach the market. Just as wholesale electricity prices direct energy around the grid, real-time road prices will become part of what driverless cars and buses “consider” in deciding how to take passengers to school or work. They will change their routes in real time to avoid, and thus eliminate, congestion and bottlenecks. Those vehicles will also communicate with one another, allowing virtually bumper-to-bumper travel at relatively high speed (called “platooning”).

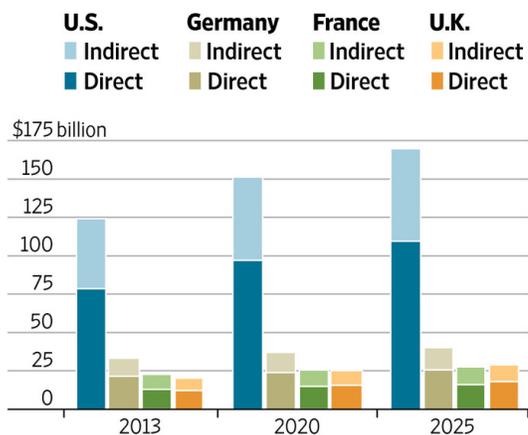
Accurate road prices will also help us make smarter infrastructure investments. A new lane, for instance, can be targeted to where its value—as reflected in prices—is greatest. Real-time road prices will reveal that value, thus reducing or eliminating the politicization that has afflicted infrastructure investment.

One concern is that real-time road prices would put greater cost burdens on drivers who need to travel at certain times and on certain routes—and poor drivers in particular. What if road prices are high when low-income drivers need to get to work? We shouldn't distort the market to help them, but instead allow prices to move as they will, and then provide vouchers or credits to help them along.

We shouldn't allow problems like these—which can be solved with smart planning—to stop us from moving ahead with congestion pricing. This major step in the transport transformation can happen now. With today's technology we can monitor a vehicle's road use and directly charge for that use. With the right prices to guide behavior, we can eliminate congestion, accurately direct investment and maximize the value of scarce road capacity. The only thing lacking is the political will.

The Price of Congestion

Annual costs of congested roads for selected countries



Note: Direct costs are value of fuel and time wasted by drivers; indirect costs are higher costs of doing business passed along to households.
Source: Centre for Economics and Business Research analysis

Dr. Cramton is a professor of economics at the University of Maryland, and Dr. Geddes is a professor in the department of policy analysis and management and director of the program in infrastructure policy at Cornell University. Email them at reports@wsj.com.

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Clogged Arteries

The major U.S. urban areas with the most traffic congestion in 2016 and the average impact on drivers

City	Hours spent in congestion ¹	Pct. of driving time spent in congestion		Cost/driver ²
		Peak	Overall	
Los Angeles	104.1	22%	13%	\$2,408
New York	89.4	19%	13%	2,533
San Francisco	82.6	22%	13%	1,996
Atlanta	70.8	18%	10%	1,861
Miami	64.8	14%	9%	1,762
Washington	61.0	20%	11%	1,694
Dallas	59.4	12%	7%	1,509
Boston	57.6	23%	13%	1,759

¹ Per driver for the year.

² Direct costs (fuel and time wasted by drivers) and indirect costs (higher costs of doing business passed along to households).

Source: Inrix Global Traffic Scorecard THE WALL STREET JOURNAL.

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