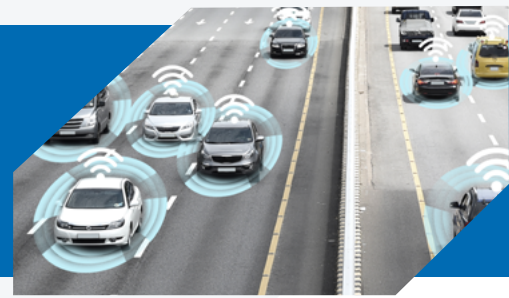


THE END OF TRAFFIC JAMS?

Smart-city transport solutions—from intelligent toll roads to scooter-sharing systems—are making cities more efficient and breathable.



- Smart technology is making city transport faster, cleaner and more efficient
- Intelligent transport is creating a wide variety of investment opportunities
- Autonomous vehicles are here—but widespread adoption will take time

Traffic jams are not only annoying—they are also expensive. According to INRIX, a Kirkland, Washington-based data company that monitors traffic congestion in big cities across the world, in 2017 delays cost Los Angeles US\$19bn and New York US\$35bn in lost productivity and extra fuel costs.¹ No wonder, then, that clogged roads are among the first targets of municipalities aiming to become smart cities.

“Population centres are densifying,” says Abhi Gami, senior investment analyst at Invesco, who covers the emerging technologies that enable smart cities. “There’s a realisation from cities that they are not going to be able to adequately support these denser communities without some sort of automation or more intelligent or more strategic management of the city. You can have a population centre with lots of talent, but if they can’t get to and from work, the productivity of that talent will not achieve its potential.”

A SMART BLEND OF HARDWARE AND SOFTWARE

Smart cities bring together two of the most important technological innovations of the past ten years: the Internet of Things (IoT—low-energy devices such as sensors and actuators that are connected to the cloud), and artificial intelligence (AI) algorithms that are able to crunch the data these devices generate. Combined, the two turn a city into a technology-based ecosystem that is able to monitor (and often has a significant influence on) factors such energy use, crime levels, air quality, and of course traffic.

“A smart city,” says Mike Zeto, vice president, IoT at AT&T, who is spearheading the company’s involvement in the sector, “is a city that uses IoT technology strategically to drive operating efficiencies and create a safer and a more liveable, sustainable and equitable environment for all of its citizens.”

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TO GET AHEAD, GO SLOWLY...AND GET HELP

Right now, many of the world's smart-city projects are relatively small pilot schemes, with planners mindful of the urban design mistakes of the 20th century, not least the congested roads that smart-city technology is trying to rectify.

"We are so early in some of the planning stages," says Mr Gami, "that bad decisions today could lead to suboptimal solutions. So what we are seeing is more incremental change, cities spending US\$10m, US\$20m, US\$30m, starting with a pilot and then building slowly from there."

One such example is Barcelona, the second most populous city in Spain, which leveraged about 500 km of fibre-optic cable to connect its bus stops to the internet, turning them into WiFi access points. These, in turn, connect with WiFi-enabled street lamps that monitor traffic flow and air quality, and with parking meters that identify the presence of parked cars. These data are made available to an app, which motorists can use to identify free spaces and which then charges their credit card automatically as they park.

"They are using the WiFi network to help reduce traffic congestion," says Clay Manley, a portfolio manager and Mr Gami's colleague at Invesco's Houston, Texas office, "and they are seeing improved quality of life for their citizens. And in the case of the parking meters, driving higher revenues—[they have seen] an estimated US\$50m increase in parking fees."

Barcelona's smart move, says Mr Gami, was to make the upgrade of fibre-optic cabling part of its general maintenance programme, saving significant costs.

"They did not have to restructure the city or create a new city," he says. "The 500 km of fibre were laid ahead of the 1992 Olympics and then expanded as they were doing traditional public-works projects, digging up streets and laying new streets."

But the digital infrastructure which these cables have enabled has created a new asset for the city: the data generated by all those sensors.

"One of the things they have done," says Mr Gami, "is to make a very open platform to share that data with their citizens and other technology and city developers, allowing innovation to come from the market. They want third parties to come in and utilise the infrastructure they have built and make it bigger and better."

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CLEARER STREETS, CLEANER AIR

Traffic management is not only about congestion, it is also about pollution, and many cities see electric vehicles and multimodal transport—whereby goods or people use more than one means to get to their destination—as potential routes to address both of these issues. Columbus, Ohio, for example, is piloting a “connected traffic system”, including smart street lamps, the rollout of 100 electric vehicles, e-bikes for police officers and the installation of charging points in multi-unit dwellings.

However, Stephen Anness, an Invesco portfolio manager based in Henley-on-Thames in the UK, warns against putting too much hope in electric vehicles at this stage.

“There are quite significant challenges to overcome first,” he says, listing a global shortage of cobalt, a key mineral used in the manufacture of batteries, the current high price of electric vehicles and their relatively short driving range, as well as the potential inability of city grids in their current form to supply the power needed for charging large numbers of electric cars simultaneously. Even just solving that last problem will be a challenge, he says: “To generate the sort of power required and to place all the cabling in the ground, I think will take decades.”



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THE END OF CAR OWNERSHIP

In the meantime, many cities are instead encouraging their citizens to swap their private cars for membership of a car-sharing scheme. According to Robin Chase, a transport consultant and founder and former CEO of Zipcar, an American car-sharing company, programmes such as these will be key to making transport smarter.²

“Technology has made sharing easy and frictionless,” she says. “It allows vehicles to be used intensively, with algorithms linking people and vehicles.”

And the impetus for change, she says, is coming from city dwellers themselves. (Bird, an electric scooter-sharing company, for example, recently became the fastest start-up ever to reach a US\$1bn valuation).³

“We are seeing more shared bike use,” she says, “more e-bikes, more electric scooters, more microtransit [minibuses with flexible routes], more restricted parking [for non-shared vehicles], experiments with curb pick-up and drop-off and with dedicated lanes. And all of this is establishing new behaviours.”

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GOODBYE, DRIVER

At some point in the smart-city future these vehicles will also be autonomous, continually cruising the streets during the day, using city data to select the best route to find people waiting for a ride and recharging themselves in out-of-town car parks overnight. Autonomous vehicles will have as big a transformative effect on city life as the invention of the car itself, and manufacturing, maintaining and managing them is likely to create significant investment opportunities. (The global market for autonomous vehicles is expected to reach the trillion US dollar mark by 2025.)⁴

As to when all traffic will be autonomous, few people will hazard a guess. The sector faces large technological, social and regulatory challenges. While the shift to autonomous vehicles will first happen with respect to highway driving, which is far less complex than city driving, no one doubts that many cities are heading in that direction. And as Mr Gami points out, the significant investments that are now being made in smart-city transport are bringing that vision ever closer to reality.

¹ Source: *The Economist*, “People say they hate traffic jams but are oddly tolerant of them” September 6th 2018. <https://www.economist.com/international/2018/09/08/people-say-they-hate-traffic-jams-but-are-oddly-tolerant-of-them>

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³ Source: Quartz, “Bird is the fastest startup ever to reach a \$1 billion valuation” June 14, 2018. <https://qz.com/1305719/electric-scooter-company-bird-is-the-fastest-startup-ever-to-become-a-unicorn/>

⁴ Source, Risk & Reward (Invesco), “Driverless cars: How innovation paves the road for investment opportunity” Issue #2, 2017



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