On Mexico City's Buses, **a Little Technology Goes a Long Way**

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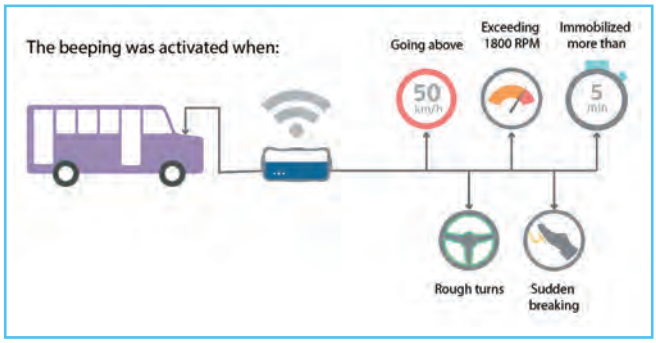
Over eight million people rely on public transport in the Mexico City Metropolitan Area (MCMA)[1]. Many daily commuters travel two hours each way under conditions that are generally unsafe. In 2016, there were 3,667 traffic collisions involving public transport in Mexico City. Over 90% of commuters report fearing for their safety while riding public transport. Many cities in developing countries face similar problems because of unsafe and inefficient public transport systems. While some privately operated vehicles fill the gap, the service is poor and they are largely unregulated.

There is great potential for technology-driven applications to improve bus safety, quality of service, and sustainability in developing world cities. This year, ITDP Mexico conducted an experiment in which automated vehicle location (AVL) technology was applied to two privately owned bus routes in Mexico City[2]. GPS devices were installed on the two bus fleets to collect data on their movements and operations. On the test route (Fleet A), a beeping mechanism let drivers know when they had accelerated, exceeded acceptable speeds, or broken safety rules, while the control route (Fleet B) operated normally. Early results show that a simple monitoring device can have a measurable impact on the safety of public transport and even cut fuel consumption, saving costs for operators and lowering emissions.

Today, cities have increasing amounts of data to help plan transport systems that are more efficient and accessible. Ride-hailing companies that offer services through mobile apps have become very popular in cities like Mexico City or São Paulo, yet their trip data is not consistently shared with cities. Despite the potential of new technology to give real-time information and simplify bus fleet planning, government agencies are often not equipped to collect or make full use of this data.

[1] Insituto Nacional De Estadística y Geográfica, "Encuesta Origen Destino," 2017, www.beta.inegi.org/mx/contenidos/.../OrgenDest2018_02.pdf.
[2] Insituto Nacional De Estadística y Geográfica, "Accidentes de Tránsito Terrestre en Zonas Urbanas y Suburbanas," 2017, https://www.inegi.org.mx/proyectos/registros/ economicas/accidentes/.

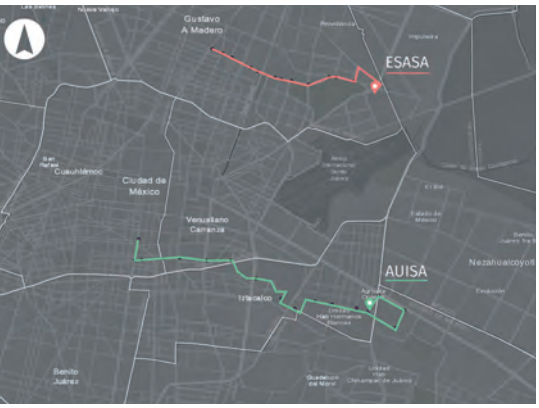


A diagram of the conditions that triggered the alarm in the treatment route.
Image: ITDP Mexico

A fleet of buses from ESASA and AUISA that participated in the study.
Photo: CISA

Cities are learning how using mobile technologies can improve transportation systems by making them more efficient, sustainable, and equitable. This includes the mapping of informal transport systems on smartphones. The challenge is how to help governments use this data to benefit the low-income groups who most need improved transit access, as well as promote environmentally-sound transport practices.

To explore how technology could improve transportation planning in Mexico City, ITDP Mexico, with the assistance of AT&T, carried out a simple experiment. The project focused on two important issues: safety and fuel efficiency. With a simple experimental framework, ITDP installed a GPS device—to track movements over AT&T's 4G LTE wireless network—on buses traveling two comparable routes. This gave the research team information about a given bus' location, rate of acceleration, braking, turning, and fuel consumption.



The routes selected for the study.
Image: ERSI

ITDP tracked the fleets for a month to create a baseline of their operation. The next month, researchers activated a beeping mechanism on the buses belonging to Fleet A, our variable in this experiment. This beeping noise alerted drivers when they exceeded speed limits, idled for more than five minutes, made rough turns, or braked suddenly. Fleet B continued to operate as before.

Early analysis of the data collected confirms that technology-based applications can have measurable impacts. Researchers found two interesting results. First, they saw a tangible decline in maximum speeds. The frequency with which buses exceeded the legal speed limit was also significantly reduced. The second result was improved fuel efficiency. By reducing excessive engine idling and decreasing speed, buses consumed less diesel. On average, Fleet A buses were 3% more fuel-efficient, saving around 1.6 liters of diesel per day. If accompanied by other measures, this could significantly impact a company's bottom line and reduce emissions.

The study also found no changes in the frequency of accelerations, braking, or turning. The drivers told us that the calibration is tricky since a bus that is loaded to capacity is much more likely to exceed RPM limits even when it's not driving aggressively. Similarly, braking and turning are mostly affected

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Transport Access for Women

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the most vulnerable road users.

ITDP and partners are working to ensure that this is a BRT system that takes into account the needs of women, children, the elderly, and people with disabilities. For society to grow and thrive, women in Cairo and beyond must have convenient, affordable, and safe options to access their cities' resources and opportunities.

Mexico City's Buses

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by traffic conditions. ITDP will consider including driver input and loading levels in future studies. A key part of this process will be translating the data into useful indicators for the people in charge of the day-to-day management and operation of the routes.

Through this experiment, ITDP learned that even a simple monitoring device can have a huge impact on the safety and efficiency of public transport systems. Ride-hailing companies already take advantage of this technology. These companies have been very successful in efficiently matching users and drivers, but they prioritize single vehicle trips, which could have adverse effects in terms of pollution and congestion. It is clear technology can play a key role in improving performance and reducing emissions. Can cities and public transport providers use these tools to improve the long-term sustainability and equity of our urban transport systems? It depends on whether collective modes of transport can become a viable and competitive option to traveling alone. These results prove that successful integration of technology will be key to improving transit service for millions of urban residents.

Jakarta's Urban Villages

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strategies for safer streets and better mobility, such as improved lighting, street safety designs, improving public transport service, and creating walking tours. These all have a much greater chance of success with local support, especially women who know their community so well. Women's groups are critical, as they are also advocates for vulnerable community members. In Jakarta, women are transforming former motorcycle routes into walkable streets to gather, work, and play. The Kampung project underscores how powerful women are in the planning of new urban mobility systems. ITDP Indonesia looks forward to our next step: training government officials to replicate our tools and methods for more neighborhoods in Jakarta.

India Program

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for municipal corporations across the country. The Chennai Corporation, for instance, stands to gain 550 million rupees per year if it charges for about 12,000 ECS (equivalent car spaces) of parking—a whopping 110 times increase.

The ITDP India Program raised this issue with several municipal corporations. In response, the Pune administration implemented a paid parking system. Ranchi's pilot parking management project, on the city's arterial MG Road stretch, led to a 12-fold monthly increase in parking revenue. Spurred by the revenue spike, the state of Jharkhand (of which Ranchi is the capital) passed parking regulations statewide.

END GOAL: BETTER STREETS, BETTER CITIES, AND BETTER LIVES

After 20 years of working with local and state governments, the ITDP India Program has achieved widespread reform, including urban mobility policies in states like Maharashtra and Jharkhand; a transit-oriented development policy in Jharkhand; and the Sustainable Cities Through Transport initiative and the Smart Cities through Smart Streets program in Tamil Nadu.

Today, Indian cities find themselves at a crossroads. One path leads to a future where infrastructure fails to deliver and people are constantly trapped in traffic and battle pollution daily. The ITDP India Program looks toward a sustainable future where generations can walk, cycle, and zip around cities on public transit. It is committed to better streets, better cities, and better lives.