What App Data Can Do for City Planners

FOUNDED IN 2009 AS A "SOCIAL NETWORK FOR ATHLETES," SAN FRANCISCO–BASED STRAVA IS TODAY BEST KNOWN FOR ITS POPULAR SMARTPHONE APP, used by millions of people all over the world to track and share their biking, running, and walking activity. Some users are serious athletes, but plenty simply track commutes or routine exercise excursions as part of a basic fitness regimen. As a result, Strava has built up a massive data set showing how bikers and pedestrians move through cities. And a couple of years ago, the company decided to do something with this information—"to give back to the people on Strava," says Brian Devaney, the marketing lead for Strava Metro.

On its site, the company released a global "heat map": a visual and interactive presentation of its (anonymized) data. You could zoom in on, say, a San Francisco neighborhood, to see which routes Strava users travel most frequently. Customers seemed to enjoy this. But the company also heard from another audience that it hadn't counted on. "We started to get all these emails from city planning groups and departments of transportation," Devaney explains. They wanted access to Strava's data, which many recognized as potentially useful for planning both short- and long-range transportation and infrastructure projects, or for tracking and demonstrating actual usage and behavior of completed projects.

This was "completely unexpected," Devaney continues, but the company has embraced the development. It formed its new Strava Metro division specifically to help municipalities get the most out of its data. "That was never on a product roadmap or any Strava long-term strategic plan," Devaney says. "It just sort of happened."

It's also one example of a promising convergence of planners' appetite for an emerging category of data—and a perhaps-surprising willingness of for-profit businesses to feed that appetite. Another example is Waze, the map and directions app that relies in part on user-submitted information about traffic conditions to suggest the best driving route between two points in real time. (Waze is now owned by Google, which incorporates some of its data into Google Maps, but also remains a stand-alone app.)

City planning groups and departments of transportation wanted access to Strava's data, which many recognized as potentially useful for planning both short- and long-range transportation and infrastructure projects, or for tracking and demonstrating actual usage and behavior of completed projects.

A couple of years ago, Waze launched its Connected Citizens Program, easing two-way data sharing between its users and various municipal entities. Apart from allowing cities to in effect communicate road closures and other projects to users in real time, the program also helps inform potential planning decisions by revealing locations with frequent traffic congestion or other problems. Last year, Waze partnered with Esri, which makes digital-mapping software for cities. The goal is to use data that Waze generates about traffic patterns to help guide transportation planning—and to reduce reliance on much more expensive data-collection methods involving Internet-connected sensors and the like.

Portland, Oregon, is one of a hundred cities that use anonymized Strava Metro data to inform planning decisions. Credit: RyanJLane/flickr

Most recently, the ride-sharing company Uber has launched Uber Movement, a service that makes available to planners and researchers information about travel times, road conditions, and other data, culled from the billions of rides the company's drivers have made. "We don't manage streets. We don't plan infrastructure," Andrew Salzberg, Uber's chief of transportation policy, told *Wired* earlier this year. "So why have this stuff bottled up when it can provide immense value to the cities we're working in?"

Taken together, such efforts present some fresh opportunities—and some interesting new challenges—for transportation planning. "It's a big leap in terms of quantity of data," says Julie Campoli, founder of the Burlington-based practice Terra Firma Urban Design and author of *Made for Walking: Density and Neighborhood Form* (2012), published by the Lincoln Institute. And on one level, this can be more informative than travel survey data, gathered in an expensive and time-consuming process involving detailed questions about transit behavior.

But as rich as the newer data may be, it can carry biases: any given app's user base may have particular demographic skews. And, as Campoli points out, not everyone has a smartphone. "It's great to have that information," she says. "But it's important to remember that it doesn't represent everyone."

A closer look at how Strava Metro data has been put to real-world use shows how these massive new caches of information can be thoughtfully integrated into existing processes. Data analysts in the Department of Transport and Main Roads (TMR) in Queensland, Australia, took an early interest in Strava's data. Michael Langdon, a senior advisor in the TMR with a focus on cycling and walking, explains that the department had already been gathering and making use of global positioning system (GPS) data for years, but it was a cumbersome process, involving lots of dedicated GPS units and relying on subjects to use them regularly and properly. "When we saw Strava, what hit us was: this actually automates a lot of the processes that we had to do manually," Langdon says.

Devaney of Strava explains that, as a private entity focused on building its user base and business, the company hadn't been collecting, storing, or packaging its data with municipal-planning uses in mind. So it had to devote research and development efforts into making the material easily usable by cities (learning to extract the relevant details, and making them compatible with widely used software and systems), and building out a team to work specifically with planning professionals. Beta partnerships with Portland, Oregon, and Orlando, Florida, honed the process, and by the end of 2016 Strava Metro was working with more than 100 municipalities. It charges annual usage fees to cover costs; these vary depending on details.

Queensland was another early partner. Mindful of precisely the sorts of biases and limitations Campoli cites, and other potential flaws, its TMR set about "analyzing and calibrating" Strava's data, ultimately publishing a detailed study of its assessment. In short, the research concluded that smartphone GPS data is best in conjunction with other data sources but can be particularly useful in evaluating the impact of a specific infrastructure project.

In fact, the department has successfully used Strava data in precisely that manner. One example involved the replacement of a floating bike-and-walk pathway destroyed in a 2011 Brisbane River flood. It took several years for officials to commit to rebuilding the New Farm Riverwalk, and the TMR sought to demonstrate that the new structure was really having an impact. "People question: 'Why are we building this? Are people even going to use this? I've never seen a cyclist on that road or bridge'," Langdon says, referring to transportation infrastructure projects in general. Traditional surveys don't necessarily answer those questions in an empirical way: just because citizens say they'd like a new bike pathway doesn't mean they'll use it.

This time, TMR had hard information to demonstrate impressive usage levels and to detail the impact on cycling behavior on surrounding roads and routes. "The Strava data does allow us to prove what actually happened," Langford says.

And that, in turn, helps new planning initiatives. Langford points to another example involving the creation of new bikeways along a major motorway. Like many big investments, it has rolled out in stages. Analysis of an early phase, using Strava data cross-referenced with official crash data and other sources, showed a 12 percent increase in bike usage over the prior bikeway—as well as a notable deflection of cyclists away from a nearby, car-trafficked road where accidents were common. "That helped us argue: 'this is why we need to complete the other sections,' because we were already seeing this benefit," he says.

The upshot, Lanford concludes, is that having calibrated and learned to use what Strava Metro offers, it's evolved into a regular part of the department's planning toolkit: "it's become pretty stock-standard for us now."

Strava Metro points to other examples in Seattle, Glasgow, London, and elsewhere. The payoff for the company, Devaney says, is that enhanced cycling and pedestrian infrastructure indirectly help encourage the behaviors at the core of its current and potential future user base. For other firms, motives may differ. For example, Waze's end-user experience is directly improved by two-way communication with cities; Uber wants to position itself as more of a partner to municipalities; and so on.

Clearly incorporating such data streams into planning practices takes effort, on both sides. But even if makers of popular apps that rely in part on corralling behavioral data never considered how cities and planners could use that information, it's encouraging that some are taking thoughtful approaches to that possibility. And the same goes for cities looking for fresh insights to guide decisions. As Campoli observes: "it's another piece of a puzzle."

Rob Walker (robwalker.net) is a columnist for the Sunday Business Section of *The New York Times*.