Funding the future of mobility

by Justine Bornstein, Simon Dixon, Michael Flynn, and Derek M. Pankratz

ILLUSTRATION BY NEIL WEBB
MOST governments rely heavily on revenue generated directly and indirectly by transportation. Everything from fuel taxes to parking fees, traffic violation fines, value-added taxes from vehicle purchases, subway and bus fares, and registration and licensing charges can provide critical revenue to maintain infrastructure, support public transit, and more.

Yet as the future of mobility unfolds, those reliable sources of funding could come under increasing strain. The rising electrification of vehicles could reduce tax receipts from diesel and gasoline. Shared mobility services may prompt people to abandon car ownership altogether, which would lead to declining revenue from sales taxes and licensing and registration fees. And if autonomous vehicles take off, traffic violations and demand for parking could plummet. For an indication of the possible revenue shortfall, figure 1 provides a snapshot of current vehicle-derived revenue in the United States and rough estimates of how it could shift by 2040.

At the same time, the need of governments globally for transportation funding has rarely been greater. Fueled by population growth and urbanization, the cumulative global shortfall in funding for road infrastructure could balloon to more than US$7.5 trillion by 2040, according to the G20-sponsored Global Investment Hub. And
capitalizing on emerging trends in mobility is likely to require new spending. For example, the experiences of London, Stockholm, and Singapore suggest the gantries, cameras, and vehicle sensors needed to enable congestion charging can cost several hundred million dollars to install. In the future, establishing even more dynamic usage-based road pricing and setting up a citywide “digital backbone”—an integrated mobility platform—that can help manage supply and demand and increase throughput could require even greater upfront investment (although the potential long-term revenue generated could also be greater).
Four ways to potentially address mobility costs

So what can be done? Some governments have explored a number of ways to help shift transportation-derived revenue away from traditional sources like fuel taxes. Four broad approaches have either proved successful, attracted interest from some governments, or may emerge in line with new technology—usage-based charging, licenses and fees, monetizing mobility data, and public-private partnerships (PPPs) (figure 2). All four have advantages, limitations, and potential challenges, and we’re not suggesting there’s a silver bullet for funding tomorrow’s mobility needs. But understanding the trade-offs associated with these different funding and financing mechanisms allows public and private sector leaders to be clear-eyed about their options as they seek to enable a mobility landscape that is faster, cleaner, safer, and more equitable.

1. USAGE-BASED CHARGING

Many countries have experience with tolling in some form, whether tied to a specific point such as a bridge or tunnel or covering a particular section of roadway. Such traditional, static tolling is typically designed to generate revenue, either to recoup the cost of building the infrastructure or cover operational costs. More recently, some governments have explored congestion charging schemes—a fee associated with entering a particular area, typically a city center—as seen in London, Singapore, and Stockholm, where those charges net between US$100 million and US$230 million annually. In
We envisage truly dynamic user-based charging systems that can adjust prices in real time based on an array of conditions, thanks in part to new technology and sensors and more ubiquitous data.

contrast to traditional tolling, many of these new efforts aren’t necessarily aiming to raise revenue—instead, they seek to manage traffic and price externalities from congestion and emissions by targeting specific user groups (such as heavy freight vehicles), geographic areas (such as city centers), or times of day (such as peak travel hours).

We envisage truly dynamic user-based charging systems that can adjust prices in real time based on an array of conditions, thanks in part to new technology and sensors and more ubiquitous data. Such a system could provide transport managers with a flexible and adaptable tool that can be used to influence behavior and help manage demand, by adjusting pricing such that people drive at different times or on different roadways. It can also be used to shift usage to different modes of transport; as driving a personal vehicle alone becomes costlier, people may switch to public transport, carpooling, or cycling. And more dynamic pricing could extend beyond roads to include curbsides, with many cities revisiting their curb management plans. New technology and detailed, dynamic maps of when an area can be used for, say, delivery vehicles and when it can be used for buses might be the first steps toward differentially charging users for their use of that space. The most encompassing version could manifest as a citywide integrated mobility platform that brings together physical infrastructure (roads, rails), modes of transport (cars, public transit, ridesharing, bikesharing), and transportation service providers (aggregators, public transport system), and creates optimization systemwide through market-clearing mechanisms.

Key considerations

Of all possible goals for road charging, raising revenue can be the most challenging and requires the longest wait for a payoff. Setting up, operating, and maintaining a road charging scheme can be quite costly (although declining sensor prices and the growing ubiquity of smartphones may help). Stockholm spent US$237 million setting up the infrastructure for its road pricing system, although it today nets the city about US$155 million a year. More fundamentally, road charging tends to work at cross-purposes to revenue aims. If the goal is to raise money, you want more vehicles on the roads paying fees—yet most road charging efforts reduce the number of vehicles. Being clear on the goals of a particular road charging plan can be key. Finally, road charging is often politically unpopular, at least when first introduced. There are often perceptions it represents a regressive tax on lower-income...
individuals who typically travel from outlying areas into the city center and who may not have easy access to alternative travel options. Ring-fencing revenue so it goes into transportation infrastructure rather than a general fund can help shore up support, as can keeping charges similar to existing public transportation fares or parking fees. More specific and accurate data about who is traveling where and when can also enable governments to target charges more precisely, potentially mitigating concerns about inequitable treatment.

2. LICENSES AND FEES

While often serving multiple purposes, licenses and permits have long helped governments raise revenue from everything from hairstyling to liquor sales. Similarly, regional and local governments can directly monetize market access for mobility services. For example, Transport for London in 2018 instituted a tiered licensing fee system for private for-hire providers; the largest such providers (more than 10,000 vehicles) will pay more than US$4 million over five years. In the United States, flat fees for ride-hailing and transportation network companies vary widely, from as little as US$1,000 in Arizona to US$100,000 in Virginia. Airport access can be particularly valuable. In many instances, fixed licensing fees are combined with per-trip or revenue-based charges.

Many cities sit on a veritable treasure trove of mobility-related data. For example, Transport for London in 2018 instituted a tiered licensing fee system for private for-hire providers; the largest such providers (more than 10,000 vehicles) will pay more than US$4 million over five years. In the United States, flat fees for ride-hailing and transportation network companies vary widely, from as little as US$1,000 in Arizona to US$100,000 in Virginia. Airport access can be particularly valuable. In many instances, fixed licensing fees are combined with per-trip or revenue-based charges.

Cities can also explore trip-based or per-use fees on mobility services to generate revenue and to help ensure public transit remains viable. Chicago adds 67 cents to every rideshare trip, for example, and hopes to raise about US$16 million in 2018 to maintain and repair the city’s train lines. Many other states and cities have implemented similar plans. Such programs can provide a key source of income—new fees on for-hire vehicles in New York could raise roughly US$400 million annually—and help keep public transportation costs competitive with private services, helping to limit the “hollowing out” of buses and trains seen in some areas.

Key considerations

While adding new fees or licensing charges could be relatively straightforward to implement, governments should carefully calibrate their approach so as not to stifle innovation or unduly penalize new mobility options, which consumers often value. Working directly with providers of such services to establish an equitable fee structure may be the best way forward. Depending on the market, the amount of revenue that can be raised from annual licensing fees is often relatively modest, in part because there are typically only a handful of major private sector mobility providers that they can be applied to.

3. MONETIZING MOBILITY DATA

Many cities sit on a veritable treasure trove of mobility-related data. Transit operators often possess highly detailed and comprehensive records of the daily movement of people. As cities and regional governments begin exploring integrated mobility platforms that private sector providers also tap into, the resulting picture of urban mobility could grow more comprehensive—and valuable. In general, cities should carefully consider whether to “give away” the valuable information and access that such a system typically collects, analyzes, and manages. Creating a free information data exchange with open APIs available to anyone, for instance, could squander an opportunity to monetize the system’s data—a potential asset for mobility providers.
services providers, advertisers, and many others. Importantly, many types of mobility data likely exhibit increasing returns to scale, where the more they are used, analyzed, and combined, the more valuable they can become.\textsuperscript{23} A variety of models could be explored, including volume-based charges (free up to a certain amount of data, with fees tied to the amount thereafter), customer-specific fees (free for individuals and nonprofits, for example), charging for specific types of access (such as APIs), and others.\textsuperscript{24}

Valuing data can be tricky, and it remains unclear what the revenue-generating potential could be from efforts to license access. Key considerations

Valuing data can be tricky,\textsuperscript{25} and it remains unclear what the revenue-generating potential could be from efforts to license access. What’s more, such a move cuts against current trends toward “open data,” which have arguably generated significant benefits for many transit agencies through the development of third-party applications that can increase overall network efficiency and customer satisfaction.\textsuperscript{26} Not all global cities that have closely guarded their data have been successful in efforts to monetize it.\textsuperscript{27} Governments will have to carefully weigh the tradeoffs in any decision to gate and charge access for data. In some cases, providing open access might be more prudent, even fiscally. For example, open public transit data could actually drive up ridership—and collected fares—by making schedules more transparent and linking them with other modes, like ride-hailing. There are also serious and potentially fraught challenges around data privacy and security that would almost certainly need to be addressed.

4. PPPs

Many of the funding approaches discussed here, and others, can be structured and executed via PPPs where governments pay private sector firms to provide a service. PPPs aim to increase the efficiency of infrastructure projects by creating a long-term relationship between the public sector and private business, and a range of models exist from contractual PPPs (concessions, build-and-operate) to institutional partnerships (joint ventures, special purpose vehicles). Governments are increasingly turning to PPPs or other types of private sector participation to attract private investment and corporate expertise (see sidebar, “Finding funding partners”). In a fast-changing environment like mobility, the private sector can bring speed, efficiency, a drive for innovation, and reduce the amount of upfront capital required to perform a project. The National Highways Authority of India (NHAI), for example, signed an agreement with a private-sector service provider to develop the first phase of the Delhi-Meerut Expressway, a project designed to reduce congestion in the city of Delhi. Under this concession agreement, the contractor will develop a portion of the expressway and operate it for 15 years.\textsuperscript{28}

PPPs also can go far beyond traditional infrastructure funding. In Toronto’s Quayside neighborhood, a partnership between Sidewalk Labs
and the intergovernmental Waterfront Toronto group aims to remake the entire area, using “urban design and new digital technology to create people-centered neighborhoods.” Sidewalk, a unit of Alphabet, committed US$50 million to the upfront planning, and its long-term vision includes a self-driving shuttle, adaptive traffic lights, a Mobility-as-a-Service app, and robot-based urban freight delivery.

Key considerations

PPPs are not always—or even often—the best solution to government funding challenges. Governments should look carefully at a range of options when deciding to bring in the private sector, or to pay for projects via some other mechanism. At the most fundamental level, PPPs typically only defer government funding—substituting annual payments for an upfront capital expenditure—unless third-party income can be generated. PPPs also have seemingly inherent complexities, including ensuring flexibility to adapt over time to meet government requirements and changing technological needs and making long-term funding available to meet contractual payments. Legal impediments and uncertainties regarding PPPs affect both the public and private sectors.
A strategic approach to funding mobility

The diverse approaches to funding are rarely mutually exclusive, and when crafting a mobility funding strategy, governments should consider what mix of policies can best meet their needs. But all successful projects should generally start with the same set of preliminary steps:

- **Understand the business model** the proposed project will follow, including financial dynamics, potential risks, when costs will be incurred, and when revenue will start to flow (including potential sources of revenue). Participants also should determine whether the project will generate cash after all costs have been paid that can be used to repay any external financing.

- **Understand the value generated** directly by a project (such as through the ability to charge usage fees) and indirectly (through the increased value of adjacent land). Governments should make efforts to capture a portion of this value generated to assist funding the specific project or future expenditures.

- **Determine the financing options available** from public or private sources, debt, or equity, depending on expected levels of cash flow and value capture opportunities.

- **Create a procurement and delivery model** to ensure the project achieves the required outcomes, including optimal risk transfer. This is essentially a definition of the proposed contract structure. Government leaders should look to build flexibility into any agreements to avoid being “locked in” as technology develops and to make it easier to stitch together plans that cover multiple geographies.

When evaluating the suitability of a particular approach, public sector leaders should also consider the political and technical complexities involved. Some approaches may face resistance from key stakeholders, requiring awareness building and education, outreach, and deft management. A number of funding options, like establishing a for-fee mobility data exchange, could demand relatively sophisticated technological capabilities. Does the government have the expertise and wherewithal to implement the policy? If not, where might the resources be found?

The future of smart cities and smart mobility looks bright—provided it can be paid for. We expect to see novel funding and financing models in the future of mobility, and here only scratch the surface of some of the most prominent approaches. By having a thorough understanding of the business models, value drivers, and financing options, governments can, in collaboration with the private sector, develop creative ways of funding future projects.

Paying for mobility solutions is likely to be an ongoing challenge for the public sector, and there is no fail safe way to meet those needs. But by acting with foresight and understanding the opportunities and challenges inherent in different approaches, cities and regions can help deliver a transportation system that could offer faster, cheaper, cleaner, safer, and more equitable mobility—without breaking the bank.●
JUSTINE BORNSTEIN is the UK Insight lead and program manager for the UK Future of Mobility practice and a senior manager at Deloitte MCS Limited. She is based in London.

SIMON DIXON is the global transportation leader for Deloitte and a partner in Deloitte’s Public Sector practice. He is based in London.

MICHAEL FLYNN is the Global Financial Advisory Public Sector leader and the Infrastructure & Capital Projects EMEA leader. He is based in Dublin.

DEREK M. PANKRATZ is a senior research manager with the Center for Integrated Research in Deloitte Services LP. He is based in Milwaukee.

The authors would like to thank Scott Corwin, Bill Eggers, Tiffany Dovey Fishman, Mark Gardner, and John Skowron, along with colleagues in Portugal—Afonso Machado Arnaldo, Renato Carreira, Silvia Margarida Coelho, Filipe Gomes Silva, and Andre Alpoim Vasconcelos—for their support and contributions.

Read more on www.deloitte.com/insights

Deloitte City Mobility Index

What does smart urban mobility look like, city-by-city? Read our Deloitte City Mobility Index special report in this issue and go online to explore profiles for nearly 50 global cities to see how they are faring so far.

www.deloitte.com/insights/city-mobility-index
1. Technically, funding and financing refer to distinct mechanisms for raising revenue. For the purposes of this paper, we treat them synonymously to avoid repetition. See Steve Hamilton and Ximon Zhu, “Funding and financing smart cities,” Deloitte, 2017.


6. Anderson et al., “Three far-flung cities offer clues to unsnarling Manhattan’s traffic.”


8. Linda Poon, “This map takes all the guesswork out of confusing street parking rules,” CityLab, April 3, 2018.

9. Corwin et al., Cities explore digital mobility platforms.

10. Anderson et al., “Three far-flung cities offer clues to unsnarling Manhattan’s traffic.”

11. Ibid.


22. Corwin et al., Cities explore digital mobility platforms.