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Insights

Cities explore digital mobility platforms

Accelerating the realization of seamless, integrated transportation

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TODAY, congestion and other transportation-related issues are major challenges in many cities around the globe, fueled by population growth, urbanization, inefficient transportation systems, and a shortfall of investment in public infrastructure. Residents and visitors alike feel every pothole, subway delay, and traffic jam.

Many city managers are straining to meet citizens' mobility needs and ease some of the problems, and partially in response, companies have

brought forth an array of mobility-related innovations. While still a small fraction of the overall mobility landscape, many urbanites are flocking to an expanded array of transportation options—carsharing, ride-hailing, bikesharing, greenbelts and pedestrian paths, and others—in many cases substituting for existing outmoded, inconvenient, and at times unreliable transit systems. With the emergence of shared autonomous mobility, connected infrastructure, and smart cities technologies, the prospects for an urban intermodal transportation ecosystem that is faster, cheaper, cleaner, and safer appear to be just over the horizon.[1]

But to truly harness emerging technologies to solve the most vexing problems, cities likely need a comprehensive, interoperable system that transcends existing infrastructure, drives standardization and interoperability, enables value creation by key parties, and cultivates technological advancements.

The concept is hardly new. Researchers at the University of Southern California described an "Intermodal Transportation Operation System" back in 1998.[2] But recent technological advances bring the possibility closer than ever, and a number of cities have already put into place components of such an integrated mobility platform:

- **Columbus**, Ohio, the winner of the US Department of Transportation's Smart City Challenge, has announced a program to create a Smart Columbus Operating System. The system will share near-real-time data on conditions throughout the city, focusing initially on mobility but eventually encompassing a full range of smart city domains.[3]
- **Singapore's** Intelligent Transport System incorporates electronic road pricing, congestion charges, and traffic monitoring via highway sensors and taxi GPS applications, all funneled to a control center that allows tracking and traveler notifications.[4]
- **Copenhagen** has launched the world's first city data marketplace, a real-world example of the mobility data exchanges that could form a key component of a broader mobility platform.[5] Multiple cities and private sector players are exploring mobility-as-a-service (MaaS) models as well.[6]
- **Barcelona** and surrounding cities have implemented an open-source platform called Sentilo that brings together data from multiple sources and underpins the deployment of smart parking and smart transit services, as well as energy consumption monitoring and smart waste collection.[7] The City Council has also implemented City OS to connect various city projects and services on a single platform.[8]
- **Dubai** launched a "Smart Dubai" initiative in early 2014, led by the city's Road and Transport Authority, which has initiated several pilot projects in traffic management, parking, electronic toll systems, and congestion management. The city also announced the creation of a "Smart Dubai Platform," in partnership with Dubai-based telecom company du, which it aims to make the "digital backbone" of the city, enabling open data-sharing.[9]
- **Helsinki** residents have been able to use a MaaS app called Whim to plan and pay for all modes of public and private transportation within the city—be it by train, taxi, bus, carshare, or bikeshare. Anyone with the app can enter a destination, select her preferred mode of getting there—or, in cases where no single mode covers the entire door-to-door journey, a combination thereof—and go. Users can either prepay for the service as part of a monthly mobility subscription, or pay as they go using a payment account linked to the service. The goal is to make it so convenient for users to get around that they opt to give up their personal vehicles for city commuting, not because they're forced to but because the alternative is more appealing.[10]

Some of these solutions are showcase examples of mobility-as-a-service. MaaS platforms let users plan and book door-to-door trips using a single app, answering the question of how best to get individual users where they're going based on real-time conditions throughout the network, taking account of all

the possible options and each user's own preferences (for example, time and convenience versus cost), and facilitating seamless mobile payment.[11] Other initiatives, such as Columbus's planned system, envision a more comprehensive "digital backbone" that provides transparency about conditions across modes and ultimately could enable operators to dynamically balance supply and demand, improving throughput. Such integrated mobility platforms can facilitate MaaS, and MaaS can ease creation of a broader platform, but neither is a necessary condition for the other.

For example, one advanced example of a MaaS solution that aspires to a more comprehensive mobility platform can be seen not in New York, Paris, or Tokyo but in the small seaside Portuguese city of Cascais. Located about 15 miles west of Lisbon, it is home to approximately 210,000 residents and welcomes another 1.2 million tourists annually.

To accommodate the fluctuating population and in an effort to secure a position as a world-class travel destination, the city launched MobiCascais in 2016. MobiCascais enables a user to reserve, manage, and pay for the use of every mobility-connected service, including bikesharing, motosharing, smart parking, taxi, transport on request, carpooling, electric vehicle charging, carsharing, and information on public transit (bus and train) routes and stations. Based on a seamless card, it connects with users through an app and a web portal. The system is an integrated platform that manages real-time information regarding all multimodal transportation systems, also allowing urban logistics and traffic management.[12]

Cascais plans to continue expanding its mobility system capabilities and reach by including additional regional partners (city of Lisbon bus and metro), adding dynamic routing for public and private modes of transport, extending the MobiCascais platform citywide, implementing a single payment platform, and introducing a loyalty program. It also aims to construct a Smart City nerve center—C3, or the Cascais Control Center—to integrate the several smart solutions already in place.

Cities such as Singapore, Copenhagen, Dubai, and Cascais are early examples of where urban mobility could be headed. Many in the private sector are actively moving to enable even deeper and more comprehensive integration. Ford, for example, launched in January 2018 its Transportation Mobility Cloud, a cloud-based platform that "can manage information flow and basic transactions between a variety of components in the transportation ecosystem—service providers, personal vehicles, bicycles, pedestrians, mass transit systems and city infrastructure, including traffic lights and parking locations."[13] The broader goal for Ford's platform, according to Marcy Klevorn, executive VP and president of Ford Mobility, is to "unlock the power of connected components at all levels of city transportation systems, not simply to improve technology, but to unlock the value for people who live, work, and play in our cities."[14]

Fully realized, an integrated mobility platform would bring together physical infrastructure (roads, rails), modes of transport (cars, public transit, ridesharing, bikesharing), and transportation service providers (aggregators, public transport system) and create greater throughput and optimization system-wide through market-clearing mechanisms.[15]

Mature mobility platforms would combine advances in Internet of Things technology, big data, and cognitive analytics to more efficiently align supply and demand, while catering to individual preferences and optimizing transport resources to improve urban life. Often these platforms integrate and support a broader smart city vision. At its core, the platform would be enabled by a dynamic nerve center that:

- Provides a central data exchange for the various types of mobility-related data generated by sensors and via electronic transactions throughout the city
- Creates visibility into network capacity across modes
- Shows real-time consumption of different forms of mobility by mode and geography

- Enables historical analyses of supply and demand to adapt the transportation system to be more fit for future purposes
- Smooths out peaks and valleys in demand, creating greater throughput and system optimization
- Creates market-driven incentives to shift consumption choices. Practically, that could mean offering discounts for people to opt for less utilized and perhaps slower routes, or to shift their travel to off-peak times
- Offers a transaction platform that creates a new source of revenue for the city and expands the market for transit service companies and passengers by offering a wider array of choices to travel from point A to point B seamlessly

The examples highlighted here are some of the first steps toward this vision of seamless, intermodal urban mobility. Putting new connected services in context and conversation—helping them work together for the benefit of users, third-party providers, and the city itself—could be key to realizing the benefits of the emerging mobility ecosystem. The journey has just begun, but we are moving swiftly toward this exciting future.

ENDNOTES

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