



SMART MOVES

A new report highlights the importance of smart parking systems to cities, campuses, and communities.

By Eric Woods

THE INTRODUCTION OF SMART PARKING TECHNOLOGY marks the biggest transformation in parking since the introduction of the first parking meters in Oklahoma City in 1935. Parking is being transformed by new technologies that are affecting operational efficiency and customer expectations. Even broader changes are being driven by new perspectives on the role of parking within cities. Faced with growing environmental and economic pressures on city transportation, cities are re-examining how and where parking is provided, seeking to provide a more balanced view of parking that better manages supply and demand. Enabled by new technologies, innovative approaches to parking are becoming one of the cornerstones of cities' mobility strategies.

Navigant Research's recent report, Smart Parking Systems, examines the evolution of smart parking technology and the smart parking system market, with a particular focus on on-street parking. In particular, the report explains how on-street parking is being transformed by the availability of real-time information on parking occupancy and parking rates and the effect that it may have on urban mobility. As part of our research, we talked to vendors, parking operators, city managers, and other stakeholders about their views on how the industry is evolving. The report forecasts that the market for smart parking systems will be worth more than \$350 million by 2020, by which time there will be more than 950,000 on-street smart parking spaces worldwide.

What Is Smart Parking?

Smart parking can be considered a general label for a range of technology and customer service innovations that are transforming parking in the city environment. A more precise definition is: The use of advanced technologies for the efficient operation, monitoring, and management of parking within an urban mobility strategy.

Smart parking is made possible by a variety of technology innovations, including sensor technologies, wireless communications, smartphones, web applications, social media, and data analytics. Smart parking is also being shaped by changes in vehicle technologies (such as in-car navigation and in-car connectivity) and other innovations in urban technology and services.

At the core of the smart parking concept is the proposition that better information on parking availability, occupancy, and prices will provide benefits to citizens, businesses, and parking operators. The ability to access real-time parking data and analyze occupancy rates and usage patterns provides city managers with new insights that can help reduce congestion and improve traffic flows. Real-time information also opens up the opportunity for a more adaptive, demand response-based approach to parking. And dynamic pricing for parking allows cities to adjust rates to ensure that optimum levels of occupancy are achieved, reducing congestion and time and fuel wasted by drivers searching for parking.

Better parking information also allows parking managers to target resources for enforcement, reducing the cost of operation while increasing revenue. The flexibility offered by smart parking systems can help shift the emphasis from enforcement and penalties to improvements in meter payments and other fees.

Smart parking systems provide more tailored information services and flexible payment options for drivers. Using smartphones and in-car information systems, drivers can access real-time information and integrate it into their travel planning and navigation. Drivers then benefit from improved traffic management, easier parking, and reduced congestion.

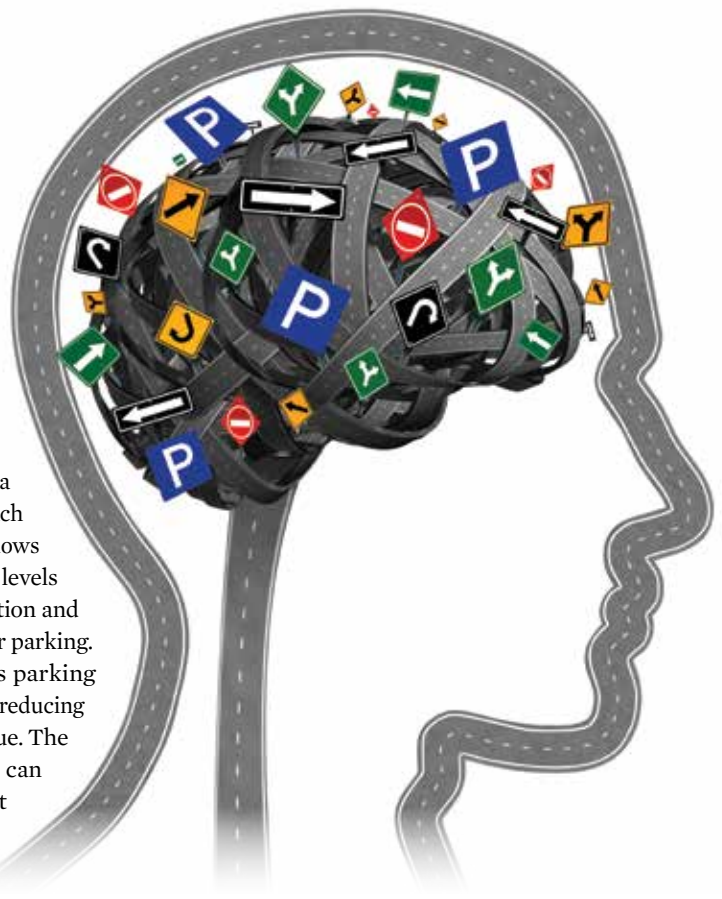
Why Now?

The growing interest in smart parking systems is in part simply a reflection of the availability of advanced technologies that enable new types of custom service and operational management. However, the market is also being driven by changing attitudes toward parking in our cities.

New Thinking on Congestion

Probably the most important factor fueling interest in smart parking systems is the need to address the problems of congestion. The commonly referenced figure is that up to 30 percent of congestion in cities is caused by vehicles looking for a parking space. Studies of specific cities typically give figures ranging between 10 and 40 percent. Congestion has long been a problem in many cities, but its current effect on the economy, the environment, and the quality of life in our cities is receiving much more attention.

Congestion leads to increased fuel use and costs, additional air pollution and greenhouse gas emissions, lost economic opportunity (in terms of consumers' time



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or effect on merchants and other service providers), and general detriment to the quality of life in a city. Historically, the answer to concerns over congestion caused by lack of parking has been to increase the parking supply, but it is now widely recognized that simply providing more parking spaces will not solve—and in some ways contributes to—congestion levels.

Smart Cities and Smart Parking

Smart parking presents a prime opportunity for city leaders looking to develop smart city solutions. A communications network that has been installed to collect and transmit data from vehicle sensors can also be used to monitor and manage other aspects of the city environment. Along with the benefits for parking and traffic management, smart parking networks can provide the basic infrastructure for other smart city services, including environmental monitoring, traffic management, and smart streetlights. For example, air quality or noise sensors can be added to the network for little extra cost. Smart parking systems can act as a foundation technology for a broader range of smart city applications.



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The Challenges

If smart parking is to become widely adopted, cities need to be convinced of the financial benefits and technical reliability of smart parking solutions when deployed at city scale.

Finance

Parking is, of course, an important (if often contentious) revenue source for many cities. On-street parking generates billions of dollars in revenue and profits for cities around the world in both meter fees and fines and penalties. In theory, this should make it easier for cities to invest in parking systems that further enhance that revenue potential. But many municipalities are still cautious about any capital investment, particularly in new technologies, and are often restricted in their ability to raise funds. For this reason, many will look at the introduction of smart parking as part of a broader change in the way parking services are delivered. Outsourcing the parking operation, for example, allows for new investment in technology and services while increasing revenue collection for the city. Another approach is to create a new public-private partnership (PPP) to manage parking, as in the ParkIndy PPP initiative between the city of Indianapolis and Xerox. Smart parking providers are also helping cities realize these benefits through leasing schemes, new service models, and finance support.

Technology Maturity

The underlying technologies for smart parking are relatively mature and proven, if not at the scale we envision reaching over the next few years. Parking sensor installation is relatively simple, and suppliers typically claim to be able to deploy to a system running hundreds of spaces in one or two days, with another week or so needed for calibration and software deployment.

The biggest technical challenge is usually adapting the system to local conditions and integrating data and systems with existing city operations. For example, San Francisco's SFpark project has had to work around the city's famous hills and deal with an exceptional amount of underground and overground cabling that interferes with sensor communications. Meanwhile, one of the major considerations in Moscow is whether the system can withstand extreme cold and deep snow. Demands for accuracy and timeliness of data are likely to grow as more use is made of sensor intelligence for enforcement, payments, and in-car guidance.

Public and Business Resistance

Parking is a sensitive political issue for many city governments. Parking fee increases, the introduction of parking restrictions, or wider policy changes can cause storms of local protest. Business organizations and local retailers often have strong and divergent views on parking policy. Parking fees will rarely be welcomed by users, but many citizens see them as a necessity. Smart parking can provide more equitable and adaptive parking fees. One of the biggest questions for smart parking systems is whether they are overly complex solutions to a simple operation. This is particularly true in relation to the introduction of dynamic pricing for parking. Cities will have to gauge carefully how often prices can

be changed and how acceptable this will be in different parts of the city. Changing prices on a monthly basis may be acceptable, but dynamic changes based on current conditions may only confuse and frustrate drivers.

The Next Phase

Smart parking systems are on the verge of a major breakthrough. The next two years will see an evolution from a small number of trials to large-scale rollouts, a broader range of pilots, and expansion into new countries and regions.

Suppliers need to convince cities of the robustness and flexibility of their solutions and the ability to both show a quick return on investment and provide a reliable service to parking managers and users. Building a set of large-scale deployment will lay the groundwork for additional city services, more use of data analytics, and the establishment of smart city networks. Smart parking has the potential to be the spearhead project for advanced smart city networks and applications. However, to realize that vision, the industry needs to show it can deliver reliable and cost-effective smart parking systems that are acceptable to city residents and visitors.

More information on the Navigant Research report, Smart Parking Systems, is available at navigantresearch.com/research/smart-parking-systems.



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