

Advances in Parking Technology

Anyone who has paid to park a car recently in New York, Philadelphia, or Chicago knows that the price continues to increase, particularly at locations in urban areas where desirable parking space is at a premium. This rise in parking rates in turn creates the need for parking facility owners and managers to come up with more effective methods of revenue control and parking management. Such systems allow near-total control of the revenue generated by parking facilities while providing other key benefits, such as reducing operating expenses, improving customer satisfaction, and possibly giving owners of these parking facilities a competitive advantage.

The loss of revenue in parking operations due to inadequate controls generally ranges from 5 to 15 percent. The specific results depend largely on the adequacy of systems and procedures in place prior to the improvement. In situations where effective revenue controls were already in place, automation might increase revenues by only 1 or 2 percent. On the other hand, facility managers tell of 40 percent revenue increases following automation.

Increases in revenue constitute only one benefit of improved technology; another is reduced operational expenses, particularly the avoidance of payroll-related expenses for attendants and cashiers. However, it is a myth that automation totally eliminates positions. To the contrary, without cashiers and attendants on site, there is a greater need for security and customer service functions.

Beyond revenue increases and expense reductions, there are "soft benefits" as well. For example, the data generated by automated systems can be used to produce business intelligence. Tools such as a "data warehouse" combine parking, claims, payroll, and financial data to allow a holistic view of parking operations and make effective management possible. Surveys indicate that parking customers prefer automated systems by a wide margin. A well-designed facility using up-to-date

technology can provide customers with a more pleasant and convenient parking experience. The increased satisfaction, however, also may be due to a greater level of trust in machines than in people, especially in an industry with an image problem.

The parking industry has not been a source of technological innovation; historically, it has been a cash business. With the growth in the size of parking garages and the advent of the personal computer, systems to calculate parking fees and to control facility access have become common. These systems use entrance and exit gates in lanes that are activated by "loops." Upon ticket issuance, the date and time of vehicle entry are captured and recorded, and an audit trail is created. With such systems, significant improvements in revenue control and accountability are possible, and more complicated rate structures can be employed. The reports available from these systems have begun to permit owners to better understand traffic flow, facility use, and parking space turnover. This type of business intelligence has allowed for more sophisticated facility and financial management. Those interested in purchasing an existing parking structure are better able to assess its value by using these system-generated reports to substantiate the property's cash-generating potential.

Building on this basic theme of cashiered, technology-enabled parking operations, the next period of growth was the introduction of cashierless, self-service facilities. While common in Europe, this technology has gained a foothold in the United States only recently. These fully automated systems can provide an even greater degree of revenue control, and offer even more data from which business intelligence can be mined. These systems give customers multiple payment options, relegating tickets to a much-diminished role. For instance, a customer typically can gain entrance to a facility by inserting a credit card instead of taking a ticket. That same

credit card can be used upon exit, creating a scenario known in the industry as "credit card in, credit card out." For those customers for whom taking a ticket upon entrance is so engrained that they do so automatically, credit card payment is still possible at the exit. This is called "ticket in, credit card out." Customers who wish to pay with cash, however, can still do so. Prior to leaving a facility, they are directed to take their ticket to a common area, or lobby. Here, "pay-on-foot" stations allow them to pay with cash or credit. Upon payment, the ticket is returned to the customer, who typically has a grace period within which to exit the facility, using the ticket to vend the exit gate. Though not typical industry-wide, these newer systems can be integrated with back-office corporate enterprise resource planning (ERP) systems to great effect. Done correctly, a balance may be struck between on-site operational control and centralized back-office financial management.

There are a number of other technologies in evidence in more sophisticated parking facilities:

■ **Radio frequency (RF)-based systems.** Especially for parkers who pay by the month, this technology affords a totally hands-free and convenient manner of facility access control in which customers place a transponder inside their car.

■ **License plate recognition (LPR) systems.** Based on digital image and pattern recognition, these systems are commonly used in the industry to identify unique vehicles. Such systems are particularly helpful in managing facilities where multiple-day stays are common, such as airports.

■ **Digital video technology.** This technology allows for cost-effective and efficient location surveillance. The chief applications are for prospective customer service and management oversight, for retrospective loss prevention, and for avoiding fallacious claims. Digital video can be accessed quite easily over the Internet.

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■ **Wayfinding and space-counting systems.** These systems, in place in many facilities, track individual cars as they enter and exit a facility, and sometimes individual areas within a facility, to indicate to customers where parking may be found within the garage. Given the sizable investment required to implement such systems, the return on investment is unclear.

■ **Autopark systems.** These systems totally automate the actual process of parking a car. After the customer exits his or her vehicle, a complex system of elevators, conveyors, and computers moves it to its parking place. Though these systems make highly effective use of available space within a garage, they have been plagued with problems.

According to some predictions, the future of the parking industry may include the following:

■ Use of data generated by the more automated systems will increase, especially by facility operators and managers with the vision to appreciate the potential of business intelligence.

■ Greater reliance on RF-based vehicle identification systems at the expense of the more visual

LPR approach. The explosive growth in wireless technologies should provide forward-thinking vendors with opportunities to exploit this technology.

■ Hands-free payment and access systems will become commonplace, at least in large parking facilities.

■ There will continue to be a place for less-automated systems—including cigar boxes—since many smaller parking operations cannot absorb the investment required for advanced automation.

■ As with other industries, less cash will flow through these parking operations, due to increased use of credit card and automated clearing house (ACH) payment methods. Some automated facilities now collect three-quarters of their revenue in the form of credit cards.

■ Pay stations will be obviated by hands-free and more electronic payment methods. Once customers realize they do not need to take a ticket upon entry, they typically prefer the "credit card in, credit card out" method from that point on.

■ There will be less of a need for on-site computer systems to make rate calculations, as vendors provide more host-based systems that rely on remote

computing. The advantage to the operator is lower installation and support costs.

■ Wireless technology and the Internet are creating new ways for customers to interact with parking companies and parking facilities. Applications include advanced purchase, online parking availability, and online account access for monthly parkers.

Parking automation technology simultaneously can achieve significant revenue increases, expense reductions, and significant improvements in customer satisfaction, while providing a wealth of business intelligence. Most applications of technology achieve one or two of these goals, but few applications can claim all of them, as can parking. For an industry that has lagged in technology and general management sophistication, parking is rapidly catching up to other industries. Forward-thinking technology vendors and owners of self-park facilities who embrace technology are achieving competitive differentiation in the process.—**John Bryer**, vice president and chief information officer of Philadelphia-based Parkway Corporation