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MERCATOR ADVISORY GROUP

PAYMENT TECHNOLOGIES: ANALYSIS AND GUIDANCE FOR MERCHANTS

A Mercator Advisory Group Research Brief Sponsored by Merchant Warehouse

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Introduction: The Changing POS Landscape

In the past five years, the point-of-sale (POS) terminal landscape has changed significantly. Prior to the launch and mass consumer adoption of smartphones, merchants relied exclusively on legacy POS systems for consumer checkout, but in the years since, new technologies and devices have empowered both consumers and merchants to handle payments at checkout differently.

While the new POS landscape is not yet settled, it is clear that three main technologies altered the POS environment. The first disruption comes from communication technology like Near Field Communications (NFC) and EMV, which could in time change the way consumers pay for goods and services. Instead of pulling out a plastic card to pay, a consumer can tap his or her mobile phone on a contactless reader to complete a NFC transaction or use the device to generate a Quick Response (QR) bar code that the merchant can scan. Some companies also use the global positioning system (GPS) and multiple radios in smartphones to support geolocation/geofencing, which lets a merchant know when a customer nearby has activated the merchant's smartphone application. When an app user in a store is ready to check out, the clerk facilitates the payment with a preregistered card by tapping the customer's image that appears on the tablet screen.

The second disruptive technology is mobile or digital "wallets," which store consumers' card and other information typically held in traditional leather wallets, including coupons and loyalty rewards.

A third disruptive technology is geolocation/geofencing, which enables merchants to offer discounts to consumers who enter their stores who have downloaded the merchants' apps on their smartphones. Whereas communication technology like NFC and mobile wallets are consumer oriented, tablet computers used by merchants at the point-of-sale are transforming the checkout experience by allowing merchants of all sizes to easily accept payments anywhere in their stores. In effect, a tablet becomes a mobile point-of-sale terminal, or mPOS. All-in-one solutions are now available that provide a purpose-built tablet, cash drawer, bar code scanner, and receipt printer as well as software in the cloud for instant access to operational data such as inventory and customer purchase data and reward programs. Since the systems are cloud based, merchants can receive continual software updates and rich analytical reports in real time, which makes these solutions extremely valuable.

This Mercator Advisory Group Research Brief sponsored by Merchant Warehouse provides an overview of the three technologies that are impacting the POS landscape today and identifies some of the leading players already replacing or upgrading their POS terminals to reflect the changing environment. This brief also examines alternative players and technologies that could impact the POS landscape in the not too distant future.

Emerging Payment Technologies

NFC

Near Field Communications (NFC) represents a more capable technology than contactless chips in cards because it delivers two-way communication between NFC chips. For use at the point-of-sale, this utility gives merchants the opportunity to send offers or rewards value to customers' phones immediately when they accept payment.

Unlike contactless chip cards, however, NFC requires considerable investment in POS hardware, and therefore its adoption has been limited (Figure 1). Cost factors could impede merchants' support for NFC use, at least for the next few years. As the U.S. market migrates to EMV chip cards, with many issuers' cards supporting both contact and contactless functionality, NFC use could grow in tandem as merchants update their terminals to accept EMV cards in order to avoid taking on liability for counterfeit card fraud starting in fall 2015 as mandated by the card networks.

EMV credit cards slowly are rolling out in the United States but various market forces, particularly legal and regulatory issues, could impede debit card EMV's progress. Merchants should monitor that situation carefully as they explore new payment technology options. Postponement of the EMV liability-shift deadlines could affect NFC adoption as well since under network rules, merchants adding EMV acceptance must include contactless EMV to avoid liability for counterfeit card fraud.

QR codes

That NFC will become a preeminent U.S. mobile payment technology of the future is not a certainty. In fact, the use of the two-dimensional bar codes known as Quick Response (QR) codes is growing much more rapidly among U.S. merchants than the use of NFC, fueled by the proliferation of wallet providers supporting the QR code technology.

Few merchants to date accept mobile payments at the point-of-sale, yet various companies are looking to change that. Merchants can easily accept QR code-based payments using existing scanners or even portable mobile devices (smartphone to smartphone) at checkout, thus supporting mobile payments at a much lower cost than with NFC, and much faster.

Hardware expense is at the heart of merchants' complaints over not just NFC but also the migration to EMV chip card issuance and acceptance. Some industry insiders view QR codes as a viable, less expensive alternative despite the lack of instantaneous two-way communication capability between smartphones and scanners at the point-of-sale.

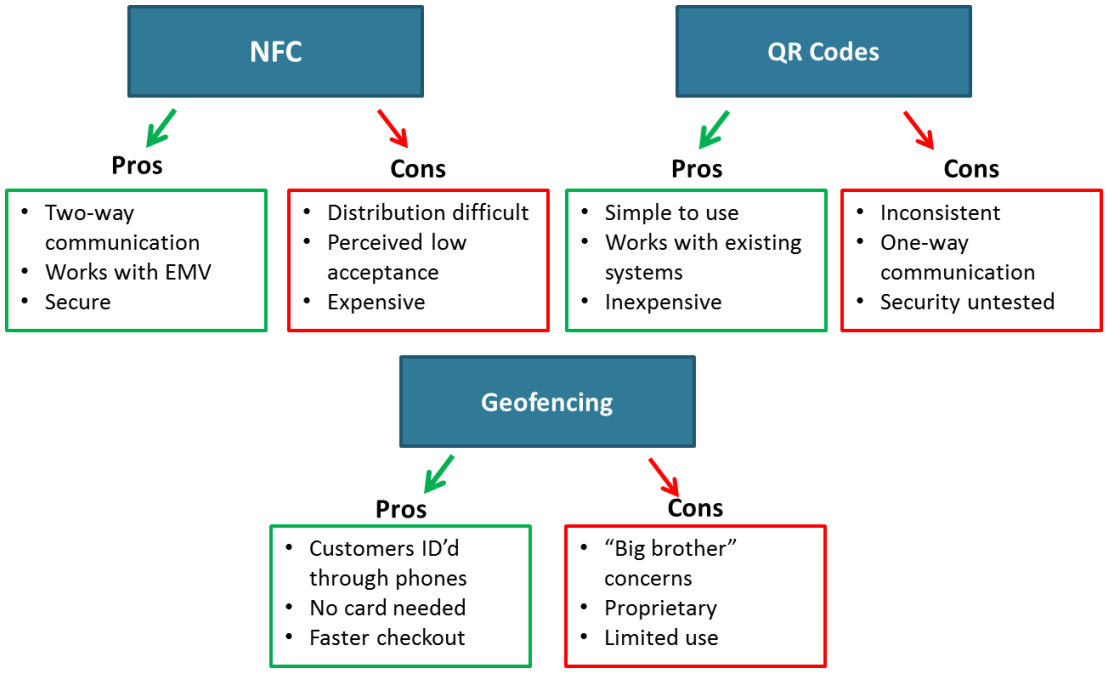
Geolocation/Geofencing

Geolocation/geofencing, which enables merchants' cloud- and tablet-based systems to identify customers through their wallet apps when they walk into their stores, also is gaining some attention, though rollouts are few and far between. Two key players supporting the technology are PayPal and Square.

With some systems, the headshot self-image that the customer has scanned into the wallet for identification purposes shows up on the tablet checkout screen when the shopper walks into the store with the app activated. A customer uses a merchant's app on a smartphone to note the items they place in their shopping carts or baskets, and the items are automatically listed on the screen at checkout. When the customer is ready to pay, the clerk clicks a button to initiate the purchase with preregistered card or bank account information. The merchant also can provide loyalty points and redemptions at the time of the sale, sending the notifications right to the customer's phone.

This technology is likely a bit ahead of its time, as most merchants and consumers lack knowledge yet of even the basic of mobile-based payments. But in time the approach could become a broadly used, especially in high-traffic stores like coffee shops and quick service restaurants that have frequently returning customers. But strong participation in the wallet app will be essential to justify the merchant's cost to support the technology.

Figure 1: How Three Common Mobile Payment Technologies Compare

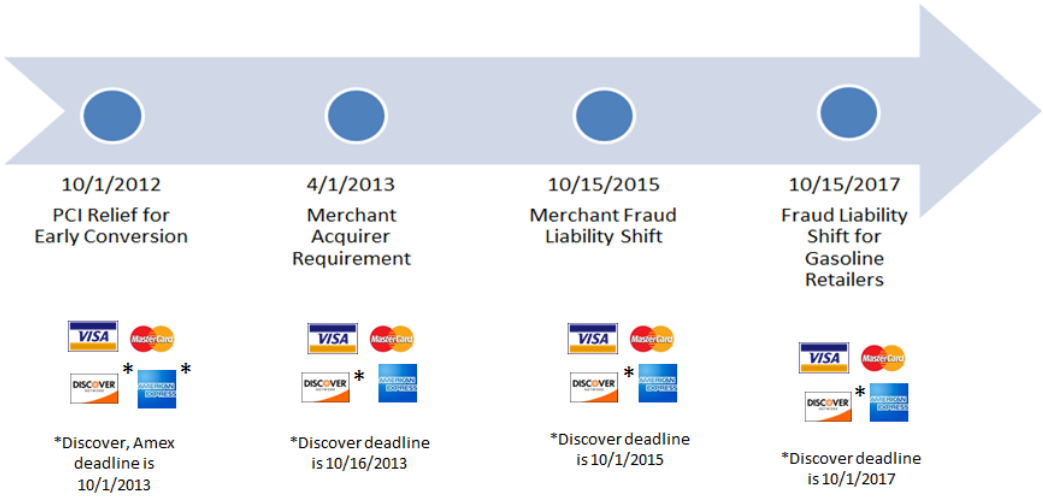


Source: Mercator Advisory Group

EMV

Although it is not a payment technology in the same vein as those described above, EMV will undoubtedly impact the U.S. POS landscape when migration begins in earnest in the coming years. Outside the United States, most of the world, especially Europe, has moved to EMV chip card technology to reduce counterfeit card fraud tied to POS payments. As the U.S. payments industry moves to EMV, merchants of all sizes will have to ensure their POS terminals are EMV compliant. Otherwise, they will face exposure to fraud because the card networks have all set deadlines for a shift to merchants of the liability for fraud due to counterfeit EMV cards if the merchants are unable to read the chips on the cards and are limited to reading the card's magnetic stripe instead. Figure 2 identifies the POS EMV liability-shift deadlines set respectively by MasterCard Inc., Visa Inc., Discover Financial Services, and American Express.

Figure 2: U.S. POS EMV Liability-Shift Deadlines



Source: Mercator Advisory Group, 2013

The main sticking point yet to be fully resolved concerns new Durbin Amendment rules under the Dodd-Frank Wall Street Reform and Consumer Protection Act that require U.S. issuers' debit cards to support two debit brands each for personal identification number (PIN) and signature transactions. This factor could lead to postponement of the card networks' upcoming liability-shift deadlines.

Visa, MasterCard, and American Express each has set October 15, 2015 as the date for this liability shift to go into effect. Discover has set its liability shift for October 1, 2015. Each network has given operators of unattended fuel dispensers two additional years to comply because of the difficulty and cost to upgrade them.

The biggest year for upgrades of POS terminals to accept EMV cards will be 2015, right before the liability shift goes into effect, unless the deadlines change. The cost of those upgrades, however, could motivate merchants to seek out newer, more advanced and less expensive payment card acceptance options, especially those supported by tablet computers.

PRODUCTS TO WATCH

Starbucks

The most successful mobile payment mechanism to date, the Starbucks Card Mobile App, produces a two-dimensional QR bar code on a customer's phone screen that facilitates payment from a Starbucks prepaid account when scanned at the checkout counter. Users of the app conduct 4.5 million payments per week, representing 10% of the coffee seller's overall volume.

mFoundry, which has developed mobile banking apps for Citi, Bank of America, PNC, and others, developed the Starbucks app. FIS now owns mFoundry. The app functions by linking to a Starbucks closed-loop prepaid account, which can be reloaded in-store, online, or through the app using a major credit card. The app also allows consumers to check the balance on their cards, monitor rewards points, view transaction history, find a nearby Starbucks location, learn about the company's coffee, and research nutritional information. In addition, the app hooks into Facebook and Twitter to allow for easy status updates and tweets. The user is given the option to password-protect the app, but Starbucks provides full balance protection for lost and stolen phones once a loss or theft has been reported to the proper authorities.

The QR code containing the payment credentials is stored directly on the device. This allows for payments to be made without Internet connectivity. Furthermore, if the bar code cannot be read by the scanner for any reason, the barista can manually enter the Starbucks card account numbers displayed on screen.

To ensure security of the data during the transaction, mFoundry hosts the Starbucks mobile payment solution at a PCI-compliant, SAS 70-certified location. All communications are made via HTTPS-based POST and 128-bit encryption over Secure Socket Layer (SSL).

LevelUp

LevelUp uses QR codes to enable mobile payment and loyalty systems. When signing up for a LevelUp account, a consumer supplies credit or debit card account information, which is immediately encrypted and then sent to the Braintree Vault payment gateway for storage. The consumer is then supplied with a QR code that links back to the payment card.

When consumers patronize a merchant that accepts LevelUp, the merchant scans the QR code displayed on the consumer's phone (either with a bar-code scanner or the merchant's own smartphone) to facilitate a purchase. The QR codes used to transact are simply tokens, not actual payment data. The QR codes map to a

token on LevelUp's servers, which maps to yet another token in the Braintree Vault. Only the combination of these tokens (and two other factors of authentication) can initiate a transaction. LevelUp provides merchants with the necessary hardware to accept its payments for free. It also integrates directly into most POS systems, including Micros, POSitouch, Dinerware, and Revel Systems.

Consumers are generally given "credits" the first time they visit a merchant (e.g., $2 off a first purchase) as well as when they have spent a certain amount of money at a particular merchant (e.g., $5 free after spending $50). Through its Interchange Zero program, LevelUp does not charge merchants a transaction fee, even though it still pays interchange on each transaction; nor does it charge up-front or monthly fees for the equipment the merchant uses to accept payments.

Instead, LevelUp charges merchants 40 cents on every dollar in advertising campaign credits that consumers redeem from that merchant. To ensure security for LevelUp users, the application employs a dynamic QR code system, randomly generating a new QR code for the consumer after each transaction. In addition, the consumer is given the option to lock the application with a PIN, and payment card numbers are not stored on the user's phone. LevelUp instantly notifies a consumer who makes a purchase that the transaction was processed, thus enabling consumers to monitor their LevelUp accounts in real time.

LevelUp has the potential to disrupt the traditional interchange equation for merchants by picking up that cost in exchange for a share of the loyalty and rewards offers redeemed by the customers it drives to their stores. That's a strong value proposition for merchants.

Burger King

Tested at 50 locations in the Salt Lake City market, the BK Mobile Crown Card app is available for both iOS and Android devices. Consumers use the app to pay at Burger King restaurants by scanning a QR tag attached to either a register or the drive-thru window. The app, which has a closed-loop prepaid account stored on file, recognizes the register associated with the scanned QR code and then uses the stored prepaid account to pay for the transaction being executed at that register.

This system of transaction routing is the opposite of both the Starbucks and similar Dunkin' Donuts systems, where the merchant scans a QR code on the consumer's smartphone screen to link the transaction on the register to the customer's payment account. One advantage of Burger King's system is that merchants are not required to spend money upgrading their scanners.

Furthermore, Burger King's system is inherently more secure for two reasons. First, if a fraudster were to take a picture of a customer's Starbucks or Dunkin' QR code, the fraudster could then repeatedly pay with the customer's account until the customer noticed and had the code reset. A fraudster taking a picture of the QR code associated with a Burger King register would have access only to the register accepting payment, not to

the cards making the payment. Without access to the payment account information, it would be next to impossible to commit any type of fraud.

Second, because the transaction originates on the mobile device, rather than the POS system, the app requires a mobile gateway. This gateway is able to verify the authenticity of both the device itself and the application on the device, preventing fraudsters from using a modified device to commit fraud.

In addition, the transaction originating on the mobile device enables the retailer to distinguish mobile transactions from cash or plastic ones on the back end. This in turn enables the retailer to analyze transaction data to determine the success of the mobile wallet program. The app was developed by Firethorn Mobile, a subsidiary of Qualcomm now called Qualcomm Retail Solutions.

MCX

Perhaps the industry will get a better glimpse of what the mobile payments market ultimately might look like when and if the Merchant Customer Exchange (MCX) proceeds with its merchant-owned mobile payment service. Announced in August 2012, MCX consists of retailers—including Wal-Mart and Target—whose collective annual purchase volume exceeds $1 trillion from 90,000 stores. Today, MCX, whose technology backers include FIS and Gemalto, is leaning toward supporting QR codes, though it intends to stay flexible should another technology take hold.

MCX representatives thus far have indicated little about their plans other than to say the objective is to reduce payment acceptance costs, keep customer data with the merchants instead of with third parties, and create a common mobile platform usable across all participating stores. One anticipated likelihood is an automated-clearinghouse-based payment system that draws directly from users' checking accounts. Official rollout announcements are expected by early 2014.

Mobile Wallets

While most of media attention today centers on the emerging universal NFC-based mobile payment solutions offered by major players such as Google and Isis, the greatest potential to extract value over the next few years will come from the other POS solutions. Two of the most successful to date, Starbucks and LevelUp, use QR codes to facilitate payments.

The Starbucks model of a single retailer providing a mobile wallet that can be used only at its own stores is gaining popularity among larger retailers in industries with an emphasis on high-frequency transactions. The LevelUp model, whereby a mobile wallet is developed by a merchant aggregator and provided to a number of submerchants for use, is finding appeal as well. This is particularly true among Tier III and IV merchants, but a few larger merchants now also accept this form of mobile payment.

Although the universal mobile wallets are expected to become far more common eventually, the current opportunities for mobile payments are almost entirely with single-merchant wallets. For a number of reasons, hardware cost perhaps being main one, universal multi-merchant mobile wallets will not be in full effect for a few years (two to five years). This timeline falls perfectly into the traditional bell curve of production adoption, in which innovators and early adopters of new technology start making waves before the technology is picked up by mass public and eventually by later adopters. As a result, the two to five year window leaves plenty of time for providers of single-merchant wallets to demonstrate the value of their products to both merchants and consumers.

Whether QR codes, NFC chips, both, or some other technology, such as geolocation/geofencing, will ultimately prevail as the chief payment technology remains uncertain. For the present, NFC appears to be the technology of choice for universal payment acceptance, while QR code use is being used primarily in closed environments. But this is not assured for the long run.

PRODUCTS TO WATCH

Google Wallet

Google Wallet is an Android app that takes advantage of the NFC secure element to perform payment transactions. However, it has struggled to gain traction because of limited handset and merchant support, among other reasons. It also has begun to limit its utility, announcing in August 2013 a decision to stop supporting gift and loyalty card NFC payments.

In-store Google Wallet transactions use NFC's card emulation mode via standard ISO 14443 contactless transactions. The Google prepaid card or virtual wallet ID is a 16-digit primary account number (PAN) that is provisioned over the air by Google to a slot in the secure element. Because of that, the availability of Google Wallet is limited primarily to customers of Sprint, Sprint's mobile virtual network operator Virgin Mobile, and those using unlocked smartphones.

Google's business model is all about the data it can collect and the advertising it can deliver. For Google Wallet users, the company gathers data on payment transactions and using the collected data deliver targeted incentives directly to Google Wallet. Furthermore, in September 2013, Google announced that it would expand the compatibility of its app to work with any phone running Android 2.3 or higher and on the iOS platform 6.0 or higher. The "new" Google Wallet for both iOS and all Android devices gives users the ability to transfer money to any valid email address, and money transfers through Google Wallet are free. The Google Wallet also has PIN security, 24x7 fraud monitoring as well as other protection features like the ability to disable the application if the phone is stolen or lost.

Only time will tell whether consumers will move to adopt the new wallet and whether Google can scale the mobile operator walls of Verizon Wireless, AT&T Mobility, and T-Mobile, which operate their own mobile wallet, Isis.

Isis

Isis is an NFC-based initiative with its own mobile wallet application. The three mobile networks involved in Isis—AT&T Mobility, T-Mobile USA Inc., and Verizon Wireless—announced the joint venture in November 2010. Despite low consumer use and merchant acceptance during Isis trials in Salt Lake City, Utah and Austin, Texas, its backers plan to roll out the wallet nationally in late 2013

Isis has managed to convince American Express of its merits. In August 2013, it was announced that American Express's Serve platform, which enables consumers to load cash to their accounts or use direct deposit and pay bills electronically, will be incorporated into Isis. In September 2013, five POS terminal manufactures and software providers—ID Tech, On Track Innovations Global, Pax Technology, Uniform Industrial Corporation (UIC), and XAC Automation Corporation—announced they would integrate Isis's SmartTap NFC functionality into their range of POS systems, joining other leading providers like VeriFone, Equinox, and Ingenico.

The mobile network operators are focused on potential revenues from rental of card account storage on the NFC chipset's secure element. In card emulation mode, the card credential is communicated to the contactless reader component of a payment terminal. This is the revenue opportunity that the network operators have told their team at Isis to pursue.

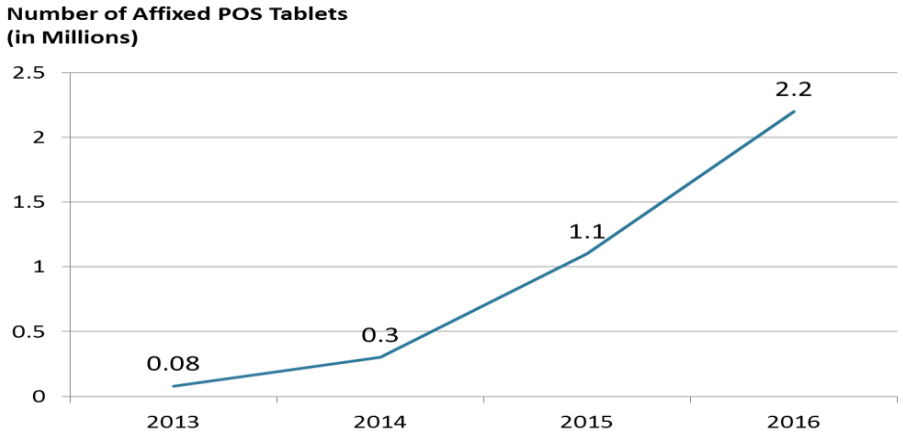
POS Software/Tablets

Twitter cofounder Jack Dorsey's Square card reader, a "dongle" that plugs into to a smartphone's earphone jack and is supported by a basic merchant app, introduced mobile payment card acceptance in 2010 to a formerly untapped market, namely "micromerchants." Many in this class of seller typically handle card transactions only periodically (for example babysitters, flea market merchants, and hawkers at neighborhood fairs). But Square's reader helped to give such merchants, as well as service providers such as plumbers and home repairmen that historically relied on check acceptance or invoices in the field, the opportunity to receive immediate payment via cards at the time of sale or service. Soon after Square's launch, the mobile card readers referred to as dongles and simple accompanying POS software became a common offering among existing terminal vendors and processors as well as among new players vying for a piece of the micromerchant market.

Some merchants began using iPhones at checkout, often to accept cards for the first time; but the small screens limited the practicality of expanding their use across a broader merchant market. That issue was resolved with Apple's launch in 2010 of the iPad, a larger mobile device that came with a 9.7-inch touchscreen display and supported many of the same functions and apps as iPhones, including Wi-Fi access to the Internet.

Today, the use of tablets to support card-based mobile payments gradually is disrupting markets traditionally backed by such other card acceptance solutions as electronic cash registers (ECRs), PC-based point-of-sale systems, stand-alone card terminals, and integrated POS systems. Processors also are being affected, as some new players are providing both the POS technology and processing, while others are supporting one function or the other. Mercator Advisory Group projects that the number of affixed tablet POS terminals in the U.S. will exceed 2 million by 2016 (Figure 3).

Figure 3: Projected Affixed POS Tablet Deployments, 2013–2016P



Source: Mercator Advisory Group

Until recently, competition among providers selling devices for payment card acceptance was shrinking. U.S. competition among stand-alone terminal makers, for example, for the past few years essentially has been controlled by three large vendors, VeriFone Systems, Equinox, and Ingenico. Now there is a plethora of newcomers selling POS software for tablet-based solutions, and they are creating new competition for such legacy market players. Their smaller user base is projected to grow.

Disruption today at the point-of-sale is at its highest since stand-alone terminals displaced ECRs some 30 years ago. Some sellers of traditional payment acceptance technology will fight the trend toward tablets at the point-of-sale, at least while they try to determine how to make money from them. Many merchants are turning to consumer-built tablets, such as iPads or Android devices they can buy on their own to drive POS software, thus removing a potential marked-up hardware sale. Some vendors are offering purpose-built tablets, but merchants will tend to use those where rugged, built-in card readers may be more practical.

PRODUCTS TO WATCH

ShopKeep POS

Born out of frustration with traditional Microsoft Windows-based POS systems, ShopKeep POS was launched in 2008. It is built around Apple's iPad and operates from a cloud-based system. From the iPad, merchants can ring up sales, accept credit cards, and print or email receipts. For an additional fee, ShopKeep POS will also provide hardware like bar code scanners, remote printers, scales, and iPad Mini devices for in-aisle checkout.

Arguably ShopKeep POS's best feature is its Web-based BackOffice, which allows retailers to easily monitor inventory, employees, and customer management through robust analytics and reporting. While the data is available in store through the iPad, ShopKeep POS has launched a smartphone application that provides merchants with a simple but thorough dashboard with real-time store sales and other data they can access anywhere.

GoPago

Launched in 2011, GoPago provides merchants with a ready-to-use tablet POS system with a tablet, receipt printer, credit card reader, cash box, and data. Users are connected online through a Verizon 4G LTE data plan, and transactions can be processed by GoPago partner Chase Paymentech (other processors can be used). Beyond the traditional payment options, the GoPago platform allows consumers to select products to purchase in advance of their arrival at a merchant, and it gives merchants the ability to manage orders in real time. Consumers can select purchases prior to visiting the retailer through GoPago's mobile commerce application, available on both the iOS and Android platforms and free to download. Merchants can broadcast their product offerings to consumers through a customized smartphone application provided by GoPago.

LightSpeed

Utilizing Apple products like the Mac computer and iPad, LightSpeed offers POS tools similar to those provided by ShopKeep POS and GoPago. However, in addition to performing as a checkout mechanism, LightSpeed can be used by retailers to seamlessly transform the iPad to a showcase and cross-selling tool that pulls up product images and information and presents them to the consumer, a function that the other tablet POS providers do not incorporate. LightSpeed similarly has a robust back-office support system that lets retailers easily access purchase data and inventory management data. The back-office support also includes features like Gallery, Trackers, and Parked Items. Gallery is a feature that allows retailers to browse photos of customers, suppliers, and products to reveal detailed info. The Tracker and Parked Item features allow the retailer to stay coordinated by creating lists of actionable items and creating a space where frequently accessed items can be easily pulled up respectively.

Recommendations

The various disruptive developments affecting traditional practices at the point-of-sale are having a profound effect on merchants as they pursue a strategic response. To proceed in an effective manner, merchants will need to follow some basic principles:

- ***Define a strategy for acceptance.*** Merchants should decide what they want their customer engagement experience to be. Do they want the traditional consumer engagement at a checkout counter? Or do they want to use mPOS devices such as tablet computers to conduct in-aisle transactions? Other options include mobile commerce or an omnichannel approach, which brings more than one of these alternatives together to create an interactive customer engagement.
- ***Do the research necessary to understand the payment technologies emerging and their use cases.*** Don't look to spend a lot of money on a new payment acceptance technology, but take notice of mobile-based solutions that can drive more customers into your stores, with payment being one of the solution's tools.
- ***Stay flexible.*** No one mobile solution has emerged as a "must have." Consequently, solutions that have flexible form factors provide acceptance options so you aren't left with potentially antiquated technology soon after purchase.
- ***Align investment with customers' interests.*** Don't try to push a technology on customers. Use market knowledge instead to support a solution strategy that will have both immediate and long-term benefits.
- ***Partner with experts.*** Merchant processors understand well the market changes that are occurring, and they can help guide you as you consider a strategy that best fits you particular goals and interests.

About Merchant Warehouse

Merchant Warehouse® is a leading provider of payment technologies and merchant services. The company's solutions enable merchants to more effectively connect and engage with their customers regardless of how, where or when they choose to shop. Merchant Warehouse's flagship technology solution, the Genius™ Customer Engagement Platform™, supports both traditional and new payment types, including mobile commerce, from a single countertop acceptance device.

Merchant Warehouse offers innovative payment solutions that help online and brick-and-mortar retailers, as well as point-of-sale (POS) developers, value-added resellers (VARs) and agents, strategically grow their business. Merchant Warehouse is one of the fastest growing payment technology companies in North America.

For more information on Merchant Warehouse, please visit http://merchantwarehouse.com.