

Contactless Commerce Enables a World Beyond Payment Cards

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Executive Summary

More than 10 million new payment cards issued in the U.S. in 2005 support contactless transactions, and the number of cards keeps growing. As contactless commerce gains acceptance, card issuers seek to extend the technology to alternate form factors such as key fobs, which offer greater convenience to consumers and can be personalized for individual tastes. One form factor that holds great potential is the mobile phone, which can readily support contactless payments and may eventually serve as a complete financial platform. However, many issues concerning the manufacture and distribution of alternate form factors must be resolved before they can be widely deployed. Consumer acceptance presents another significant challenge. Will people feel as secure with other credit and debit items as they do with cards? Early trials will reveal much about the market for these new physical forms of payment technology.

A new type of transaction

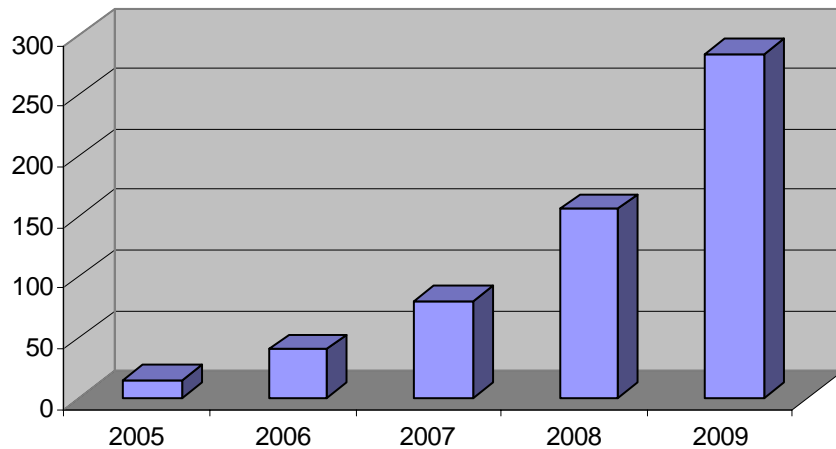
Since 2005, payment cards in the U.S. have been undergoing their biggest physical and functional change since the introduction of magnetic stripe cards in the 1960s. Embedded within these new cards is a mini transponder, consisting of a micro-controller chip and antenna. The transponder enables the card to communicate with a point of sale (POS) terminal wirelessly, launching the era of what has been called “contactless commerce.” In a contactless transaction, a consumer simply taps his credit or debit card to a contactless POS terminal. The card and the reader in the terminal establish a wireless link, transferring the information required to complete the transaction. The POS terminal then completes the transaction through the existing payment infrastructure, in the same manner as a traditional magnetic stripe transaction.

Previous attempts at introducing “smart” payment cards, such as contact smart cards, met with limited success in the U.S. for several reasons primarily because the user experience was mediocre and the transaction times were slow. But today’s contactless cards present a more compelling business case, plus a fast and friendly user experience, leading all three major card associations—MasterCard, Visa and American Express—to launch contactless products in a big way. Large issuing banks such as JP Morgan Chase, MBNA and HSBC have announced contactless cards, and some have begun issuing cards in large numbers. As further evidence of the attractiveness of the business case, national merchant chains such as 7-Eleven, CVS/Pharmacy, Ritz Camera and McDonald’s have installed readers at most or all of their U.S. locations to enable use of the contactless cards.

So why has the contactless card launch been so successful this time? First, card associations require the use of a finalized standard, ISO 14443, for the contactless interface which ensures that reader and card manufacturers can build products that guarantee interoperability. Second, security features have been developed to improve the authenticity of the transaction, and to combat transaction fraud. Finally, the incremental cost of adding contactless functionality to a card or POS terminal is at the point where the economic benefit to issuers, merchants and consumers is strong.

For consumers, the transactions are easier than fumbling for cash, and they are fast—53 percent faster than using magnetic stripe cards, and 63 percent faster paying with cash, according to studies by American Express. For merchants, the cards result in incrementally higher spending than with cash, since consumers are not limited by the available cash in their wallets. For payment card issuers, converting cash to credit or debit transactions can significantly enlarge their business. Finally, everyone benefits from the reduced potential for fraud, since the card never has to leave the consumer’s hands.

WW Contactless Payment Issuance



Source: ABI Research

More than just cards

The convenience and economic benefits of the new contactless payment technology are not limited to just cards. The secure payment element consisting of chip and antenna can be built into a variety of form factors, such as key fobs or personal electronic devices. This capability gives the issuing banks new ways to differentiate their products and target specific demographic groups with appealing forms. It also gives issuers a means to lower their new customer acquisition cost, which can average as high as \$120 per customer, as consumers who already hold an average of more than 3 credit cards each respond to the appeal of these new form factors. For example, a new football-shaped key fob emblazoned with the local sports team logo, could attract new customers more easily and at a lower acquisition cost.

For the consumer, these new payment forms have a variety of appeals. As the explosion of the cellular phone ring tone market proves, consumers are very interested in customizing the routine aspects of their daily lives with content that expresses their individual tastes and interests. They also value the kind of convenience that a payment token attached to their keychain can provide, as demonstrated by ExxonMobil's successful SpeedPass™ program. ExxonMobil has issued more than 7.5 million SpeedPass tokens worldwide, which has significantly increased sales at convenience stations.



Figure 2: Key fobs provide a convenient payment method that is faster and more secure than cash and credit cards.

Successful new technologies usually enable a convergence of some kind, and so will these new contactless payment form factors. Multiple applications, such as loyalty and reward programs, can be combined in a single-themed key fob with the payment token. The consumer would then have all this functionality available in a single device on a keychain or in a pocket, or possibly attached to a bracelet or necklace. There would be no need to always carry a purse or wallet—a convenience that joggers could certainly appreciate.

A variety of form factors

The basic implementation of these new forms is the key fob. These can be small cards, sometimes called “2-D” fobs, which are about the same thickness as a credit card and small enough to slip onto a key chain. Most consumers are already familiar with these through their grocery store loyalty cards. One advantage of this form factor is that 2-D fobs can be made using existing manufacturing processes that are already in place at card manufacturers around the world. The fobs can be produced with the familiar rectangular dimensions or in any shape in keeping with the theme printed on the card.

“3-D” fobs are anything thicker than the standard payment card and could be fashioned into just about any shape imaginable. Possibilities include forms such as a football helmet, basketball or other sports team identifier, or a medallion in the shape of a company logo. Other shapes could appeal to those who want to make a fashion statement, or to those who might prefer something small and unobtrusive.

Another option would be to design the payment technology into the existing portable electronic devices consumers already carry, such as watches or iPods. The payment device may be either an add-on or built into the larger unit. The flexibility of this option would enable the consumer to choose which platform he or she is most likely to carry

around in daily life. Issuing banks and other industry players are currently performing research to determine which form factors consumers would prefer.

Of course, the most ubiquitous portable electronic device in much of the world is the mobile phone. And it is here where contactless payment technology holds much promise. A mobile phone could be used for purchases just by tapping it to a POS terminal, and it could also enable new kinds of transactions. For instance, a consumer could tap their phone on a store display to download an electronic coupon that could be used at purchase. In addition, the phone could be used to download a movie trailer and purchase tickets from a “smart poster” at the local theater. These types of applications are currently being developed through the Near Field Communications (NFC) Forum industry group.

Integrating all this functionality with a range of other electronic banking options turns the mobile phone into a portable financial manager. However, getting to this point where the mobile phone becomes such a powerful tool for consumers will take time. Many stakeholders in this arena, from handset manufacturers to wireless carriers to the card associations, must overcome the challenges in developing the most effective business model for all involved.

Market timing

With over 10 million contactless payment cards introduced in the U.S. in their first year of availability, the mass deployment of new contactless commerce form factors is likely to follow close behind. Currently trial programs are underway, such as the American Express *ExpressPay* key fob, which links charges to either the ExpressPay on Blue contactless card or any other American Express Card. And in the summer of 2005, Citibank began trials in New York City of its MasterCard *PayPass* key fob.



Figure 3: Alternate form factors help differentiate brands, reduce fraud and increase throughput for merchants.

As issuers, merchants, and the card associations learn how consumers are using their key fobs, the business case for these products will become clear. Will consumers prefer the speed, convenience and customization possibilities of the new form factors over conventional cards? Will the “cool factor” overcome any concerns consumers have over carrying an additional item in their pockets? The answers to these questions are now being answered in these market trials.

In the meantime, the first available products from banks are offering alternate form factors to complement to their contactless cards in some markets, giving consumers the choice of which device to use. It seems likely that this model will be followed for some time, as consumer acceptance is proven and other challenges to mass deployment are overcome. Eventually, the ways that consumers want to use alternate form factors will be determined, and products will appear that meet the demand.

Challenges facing alternate form factors

Today, consumers accept the traditional card as a trusted form of payment, but they may feel that using a fob without a name or account number printed on the exterior does not offer the same level of security. They may also have a greater fear of loss or theft. However, as they become more familiar with the devices and connect with the fraud protection policies and promotional efforts of issuers, consumers will determine that these devices offer the same protections against fraud and theft that their cards do, while providing the additional security of the device never leaving their hands.

Challenges remain for the industry as well. Over decades, card makers have perfected secure procedures for the manufacture and personalization of cards. Now the management of new component suppliers providing services such as plastics injection molding must be incorporated into that system. Manufacturing and personalizing the non-standard forms must also be made cost-effective. Then there are the issues related to fulfillment, such as how to package and mail 3-D fobs or other form factors. Methods to destroy expired fobs must be determined as well. All of these logistical issues require careful planning and execution in the security-conscious financial services industry. Since alternate form factors are basically convenience products that tie into consumers’ lifestyles with personal appeals, resolving the issues of personalization and fulfillment will be one key to their success.

These new form factors will raise the bar for technology component suppliers as well. The power requirements and read-range performance of the chip and antenna is critical to enabling a true “tap-and-go” experience for the consumer. The read-range is important for providing a consistent buying experience, as consumers will need a clear indication that the transaction has been successful the first time they tap the card or other payment form to a contactless reader. A chip-antenna combination that requires too much power or results in a read-range that is too small may result in the payment device not being engaged with the reader’s field for enough time to completely power-up and execute the transaction. Through its consumer research, MasterCard has

determined that a read-range of four centimeters yields the consistent and robust transaction processing necessary for the transaction to be successful and “feel right” to the consumer. Achieving this read-range will be even more challenging for small key fobs, which will require smaller antennas than those in the contactless cards. With these smaller antennas, a chip supplier that optimizes chip designs for low-power operation, like Texas Instruments, will be more likely to meet the needed performance requirements.

Conclusion

Factors for Success

For everyone involved in the payment industry, being successful with alternate form factors will mean creating products that are easy to understand, manage and use. Banks and card issuers will need to offer fobs and other new products that not only provide traditional security to consumers, but also make them feel secure with these new forms of payment. In addition to developing convenient and appealing designs, methods will need to be implemented to personalize the devices effectively and replace them easily if they become lost or damaged. Merchants can help foster the success of these new form factors through training of clerks and with promotions that show their customers the greater convenience of tap-and-go payments.

For the contactless payment technology suppliers, the challenge is to make ever-smaller, cost-effective chips and antennas that offer robust performance and support stringent security requirements. Fortunately, the fundamental technology is well-established, with strong support from a large network of systems specialists. Furthermore, technology providers are looking ahead to what capabilities contactless technology may offer the financial services industry in the future.

In today's market, contactless commerce is growing rapidly through the traditional card form factor, and efforts are underway to introduce the technology in alternate form factors. As consumer use of contactless products increases, more information will become available regarding the implementation issues of key fobs and other alternate devices. Since the alternate form factors will be designed to fit into people's lifestyles, their success in the market is likely to come from finding the right means to personalize these products and to get them into the hands of users as efficiently as possible. As consumers become more comfortable with alternative form factors, contactless-enabled mobile phones offering a full-range of financial services may ultimately become their platform of choice. Whatever the future holds, alternate form factors for contactless commerce are certain to be in it.

About the Author

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Steve Turner has 20 years of experience in various engineering and marketing positions in the electronics industry, and is currently the marketing manager for TI's contactless commerce business. Assuming this role in 2005, he is responsible for developing business opportunities in the growing field of contactless payment cards.

Steve joined Texas Instruments in 1987 as a methods and equipment engineer for the company's Defense Systems Group, supporting such programs as the Harpoon and Tomahawk missile program before becoming lead producibility engineer for TI's Gen-X decoy and later various DLP-based systems. In 1997, he joined TI's Semiconductor Group, as worldwide marketing manager for the Speech Products business unit. In this role he was instrumental in winning business for products such as Tiger Electronics' talking "Furby" toy. In 2002 he became the business development manager for TI's UltraWide Band (UWB) program, winning industry support for TI's multi-band OFDM technology proposal, and helping to create the WiMedia/MBOA industry alliance.

Steve holds a Bachelor of Industrial and Systems Engineering degree from Georgia Institute of Technology.

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