News
"Ring-Ring" Might Soon Mean Ka-Ching

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Readers of the technology industry's tea leaves could reach one of two conclusions regarding widespread deployment of a global pay-by-mobile-phone infrastructure: either it's so close it will be ubiquitous within three or four years or it's so overhyped by mobile carriers that it could be a decade away.

In February, the GSM Association (http://www.gsmworld.com/index.shtml), the industry umbrella organization of GSM mobile network operators, announced two major initiatives in which mobile phones would serve as transaction devices. One is a mobile money transfer plan that would enable migrant workers to wire money back home to their families more quickly and easily than existing methods. The other is a worldwide "Pay-Buy Mobile" initiative that would enable payment by mobile phones equipped with chips similar to those on smart cards.

Can mobile wallets fly where smart cards flopped?

Several of the world's biggest mobile carriers and financial clearinghouses that are partners in the initiative supplied laudatory quotes about the GSMA announcements. However, two of the partners, Rogers Wireless in Canada and MasterCard, ignored requests for details, and two others, Cingular/AT&T Wireless in the US and Telenor in Norway, said it was really far too early to explain how their phone-enabled transaction technology and business ecosystems will emerge.

This could indicate that the "mobile wallet" will end up as underwhelming as the hype surrounding smart cards in the late 1990s. However, Mohammad Khan, president and founder of point-of-service technology vendor Vivotech, is a veteran of the payment industry, and he says this time around should be different.

"One major reason smart cards failed in the US was, they didn't offer any value proposition to the consumer," Khan says. "They slowed lines down at retailers. The only thing the smart card offered was security to issuers, and nobody else benefited."

However, the evolutionary progress of smart cards and contactless RF-enabled payment terminals has laid a solid foundation for what Khan and his colleagues believe will be a revolution in transaction speed and convenience as well as personalization of loyalty programs, advertisements, and special offers. The mobile phone as mobile wallet offers convenience, features, and security far beyond what any sort of plastic card can provide, they say.

In fact, Khan says, the companies involved in mobile-phone transaction pilots are keeping their project specifics close to the vest because they see tremendous opportunity just over the horizon—not because the technology is overhyped.

"They don't want their competition to know what they're doing," Khan says. "They're now in a mode where they're close to commercial rollout, and everybody's a lot more sensitive today than a year ago."
Near-field communication nearly ready

The technological foundation of the mobile phone transaction ecosystem is near-field communication, a radio technology effective within a range of about 10 centimeters. The NFC tag format is based on existing ISO smart card RF standards and Sony's FeliCa technology. The NFC industry's umbrella organization, the NFC Forum (http://www.nfc-forum.org/home), has recently standardized the NFC data exchange format and record type definitions.

NFC Forum marketing committee chair and board member Gerhard Romen says the forum has defined three interaction modes: read/write, peer-to-peer, and card emulation. He expects to release the first comprehensive set of standards during the second half of this year. Progress has been steady, and with the first platform now defined, Romen sees the first vertical industries coming to market soon.

Many carriers, banks, and card issuers have begun pilots. HSBC Credit Card Services and MasterCard are conducting the most recent US pilot, with Vivotech (http://www.vivotech.com/newsroom/press_releases/HSBC_release.asp) supplying the phone software. A Taiwanese pilot (http://www.vivotech.com/newsroom/press_releases/taipei_release.asp) is going even further, letting users not only pay by phone but also download coupons and merchant incentives.

Romen says the pilots, which often involve employees or hand-picked customers of the participating companies, are the first step in what the industry sees as a "soft rollout" that will likely proceed on a regional basis.

"NFC keeps it simple for the end user," he says, citing its close relationship to the transaction procedure used for contactless credit and debit cards. Being able to wave the phone in the vicinity of a sensor has benefits for merchants as well. The pilot projects have shown double or triple speedups at checkout, Romen says. The phone software also automatically loads the "loyalty cards" that merchants give customers for scanned discounts into the phone. This lets merchants offer information such as movie reviews, promotions, and ticket sales, which customers receive by touching their phones to a smart poster or other service interface. "We did studies with the demographic group aged 21 to 32 and asked them, 'What would you rather leave at home, your mobile phone or credit card?'" Romen says. "And they said their credit card."

Rob Bamforth, UK-based principal analyst for Quocirca, concurs with Romen that industry veterans who saw smart cards fall flat are more sanguine that gradual adoption of phone-enabled technology will take firmer root.

"I recently talked with two fans of smart cards," Bamforth says, "and they seemed to believe that what didn't happen with the multifunction card can happen with NFC. But they believe it's likely to start in one place and build on that one place and I think the opportunity is there, if the technology is right, for it to be broadly deployable."

"If the technology is right"

Bamforth's phrasing highlights two issues NFC proponents face. First, the contactless payment model must make users comfortable with the concept. Second, the technology companies involved in NFC work must convince financial sector partners that everyone along the transaction chain will see value in adopting pay-by-phone practices.

In the US, for example, the vast majority of point-of-sale credit and debit card purchases are still done by swiping cards that include account holder information on a magnetic strip. Furthermore, the contactless payment trials aren't large enough to have attracted much general media attention. So, predicting how consumers will react to the new technology is still hard. Jean-Louis Carrara, vice president of marketing for the North American telecommunications arm of technology vendor Gemalto, says contactless payment is being introduced almost in what might be called "stealth" mode.
"Ten percent of the cards in the wallet by the end of the year will already have a chip inside with an antenna embedded," Carrara says. "It looks like a mag stripe because we don't want consumers to think anything is different. But the card is different; cards like Chase's blink and MasterCard's PayPass are contactless cards, which means they have a smart card chip and antenna embedded. The card won't be swiped in the future, just tapped, and once people learn its movement, which I believe will come within the next two years, they'll be able to tap with phones very quickly as well."

As for making the technology right for the industry, the GSMA recently endorsed the Subscriber Identity Module approach proposed by Gemalto for storing security and provisioning technology within handsets. SIM is a card-based approach, which GSMA favored over storing that information in an embedded chip. The card-based technology includes features that let each financial and network provider remotely and discretely provision and manage the user's account information. It also lets users change handsets without losing any information; all they need to do when they change handsets is slip the old SIM card in the new phone.

Doug Chambers, GSMA director of terminals, says this should figure favorably, as adoption of NFC-enabled technology will likely happen via the natural phone-replacement cycle, and consumers should find the SIM card-based system very convenient. Chambers says the average phone is replaced every 17 months, though early adopters and style-conscious consumers tend to get a new phone every six months or so.

The GSMA will hold its first major Pay-Buy Mobile trial in South Korea later this year. Chambers says much of the country is already wired for phone payments, and he expects Asian markets to adopt the technology first, followed perhaps by the US.

"In America, the banks have been building up the infrastructure, though you don't know it. It's more advanced than Europe, strangely enough. I wouldn't be surprised if America doesn't start catching up."

How secure?

One of the first questions likely to surface about RF-enabled phone payments is how secure the technology is. As consumers and financial institutions grapple with ever more varieties of credit card fraud, some observers might perceive data sent via radio signal from a phone to a point-of-sale terminal to be a garden spot for thieves. Two 2006 studies offered two views of contactless security. A study by the RFID Consortium for Security and Privacy (pdf, http://prisms.cs.umass.edu/~kevinfu/papers/RFID-CC-manuscript.pdf), a group of academic and industrial researchers, found several physical vulnerabilities in first-generation smart cards in the US. A paper by Philips Semiconductors researchers Ernst Haselsteiner and Klemens Breitfuß (pdf http://events.iaik.tugraz.at/RFIDSec06/Program/papers/002%20-%20Security%20in%20NFC.pdf) said NFC is inherently secure, in part because it's not subject to man-in-the-middle attacks. This lets application developers safeguard against vulnerabilities by implementing standard key agreements such as the unauthenticated Diffie-Hellman protocol. Even the CUSP researchers wrote that next-generation NFC security would probably be enhanced by transferring the technology from cards to phones:

Ultimately, credit card functionality will see incorporation into higher-powered consumer devices, such as NFC-ready mobile phones and will benefit from the security protections of these host devices, such as biometric sensors and increased computational capacity.

The real issues with hastening phone payment won't be technical, the experts contend, but crafting a business model acceptable to everyone involved.

"The real question is just how far can you go into each other's environment?" Gemalto's Carrara says. "You have some operators who are asking a lot from the banks as far as being part of every transaction, but you also see most pilots announced without an operator. So the operators are afraid
they will be disintermediated, and the banks are afraid the operators will take everything, because in Japan and Korea, the operators have actually purchased or invested in financial institutions."

The NFC Forum's Romen says the potential revenue streams available to operators through on-phone advertising and promotions, the potential savings for card issuers in managing electronic instead of plastic accounts, and the appeal of fast and secure payment for consumers point to an overall winning combination.

Consumers will still have cash and cards available, of course, which will discourage carriers from charging them for transactions, Romen says. And the benefits to everybody in the transaction chain will be evident in good time.

"Give the banks, the carriers, and the equipment manufacturers time to make it happen, then we can start the consumer story," he says. "Up to now, the cards were the banks' customers and the phone was the operators' customer. Now that convergence is happening, we need agreements that create synergy, and I think it will definitely happen before too much time passes."

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- "Card-based Macropayment for Mobile Phones," Proc. Int'l Conf. on Mobile Business (ICMB 06) (http://doi.ieeecomputersociety.org/10.1109/ICMB.2006.10)

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