

A Wallet in Every Phone

Will mobile payments take off in the United States?

BY TIM SABLİK

In 2007, Visa released a commercial with a line of customers winding smoothly through a crowded café. As beaming workers served drinks and sandwiches to a clockwork beat, each customer stepped up to the cash register, swiped a Visa card, and was quickly on his way. The rhythmic flow ground to a halt, however, when one man approached the counter and sheepishly reached for his wallet to pay in cash. The cashier glared at him as she opened the register and counted out the man's change while everyone else in the café looked on impatiently. The ad's message was not subtle: Cash is passé.

In a few years, the same scene may be filmed with cards as the villain and the mobile phone as the hero. Already, when you walk into a Starbucks for your caffeine fix, you can pay by scanning a barcode displayed on your smartphone via the company's mobile application (app). And soon you might not need to reach for anything at all. The phone in your pocket will detect that you've entered the coffee shop and immediately add your name and picture to the cashier's register. After you've ordered, you'll just give your name to the cashier, who will match your face with your picture to verify your identity; the order will then be charged to an account linked to your phone. As you head out the door, you will be able to check the digital receipt sent straight to your mobile wallet.

This is the sort of future envisioned by Square Inc., one of many recent mobile payments startups. Square's app can also process payments using bar codes similar to those used by Starbucks. In fact, customers of the java giant can now pay with Square thanks to a partnership between the two companies. Google is another newcomer to the payments sector, having launched a mobile wallet on its Android operating system for mobile devices in 2011. PayPal, which found earlier success as a payment service for online transactions, is now accepted as a payment method at physical stores like Home Depot and has a mobile app that allows users to send money to anyone's email address or mobile phone number. Most recently, 14 merchants, including Wal-Mart and Best Buy, banded together to develop their own mobile payments network. The merchants hope to draw consumers into their payment system by offering targeted incentives and rewards through the same devices customers use to pay. Major card networks don't intend to be left out of mobile payments either; Visa showcased its mobile payment services at the London 2012 Olympics by setting up thousands of mobile payment terminals to accept payments from smartphones distributed to athletes.

Will Americans Want to Make Mobile Payments?

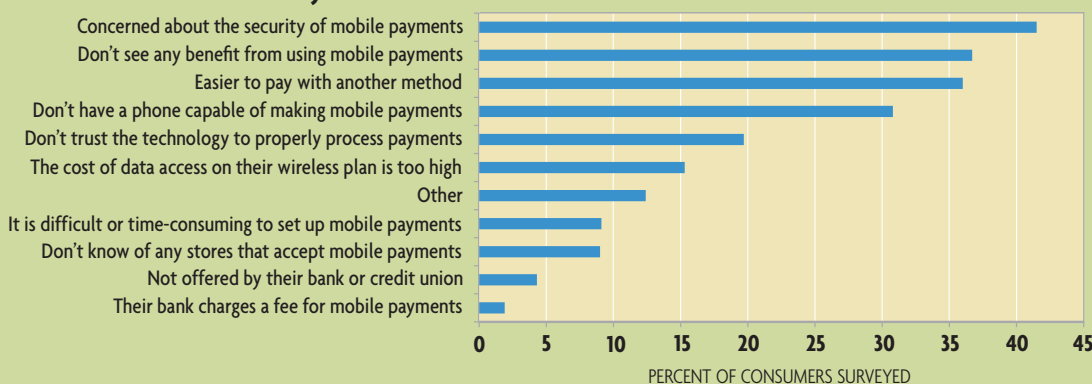
According to a survey released in March 2012 by the Federal Reserve Board of Governors, only 25 percent of consumers expressed interest in using their mobile phones as a payment device at the point of sale. The number-one reason survey respondents gave for not using mobile payments was that they were concerned about the security of the technology (see chart). Still, financial institutions, technology firms, and merchants are betting that consumers will overcome their worries and learn to love mobile payments. Are they right?

There is reason to believe mobile payments could catch on. According to the Pew Research Center, mobile phone ownership among American adults has been trending upward steadily, from 73 percent in 2006 to 88 percent in 2012. Nearly half of adults in the United States owned smartphones in February 2012, more than those who owned basic mobile phones (which can only make phone calls and send text messages). As users rely on their smartphones for an increasing

number of functions, established payment networks and startups alike are hoping to add the wallet to that list.

There are already signs of a growing interest in alternative payment solutions in the United States. Prepaid debit card payments were the fastest-growing noncash payment method in a recent Fed payments study, with the number of transactions increasing by 21.5 percent

Concerns About Mobile Payments



SOURCE: Federal Reserve System Board of Governors

per year from 2006 to 2009. The value of prepaid card payments likewise grew 22.9 percent per year in the same period. Nonbank institutions such as PayPal allow customers to deposit money into a prepaid account to make purchases or transfer money to other users. According to PayPal's parent company, eBay Inc., PayPal had 113.2 million registered accounts as of July, a 13 percent increase from the previous year; eBay's president and CEO, John Donahoe, predicted mobile transactions would reach a volume of \$10 billion in 2012.

Convenience is one of the oft-cited benefits of mobile payments. In a survey of literature on mobile payments, Fumiko Hayashi of the Kansas City Fed reported that consumer surveys point to convenience as a major determinant of payment choice. Consumers with smartphones that are equipped with Near Field Communication (NFC) chips can make payments simply by waving the phone over a payment terminal. In the case of Visa's NFC payments at the Olympics, small purchases required no further authorization, speeding up the time it takes to buy a drink or a quick bite to eat.

In other countries, speed and ease of use have contributed to the success of mobile money. Japan's population began using mobile phones in 2004 to make contactless payments at vending machines and train stations; using it to pay for other goods and services was a natural extension.

Mobile Payments and the Unbanked

Kenya enjoys the distinction of being a world leader in mobile payments due to the huge success of M-PESA, a service that allows users to send and receive money by text message without a bank. In Kenya's case, mobile payments developed to fill a gap in traditional banking services.

"There was a definite unmet need," says William Jack, an economist at Georgetown University who has studied M-PESA. "Kenya is a society in which families are often split up geographically. Sending money home used to mean literally getting on a minibus and transporting the money, which was fraught with costs. M-PESA virtually eliminated all of those costs. It made sending money home much easier, more affordable, and more convenient."

Since mobile provider Safaricom established M-PESA in 2007, about a third of Kenyans have opened accounts with the service. Users can deposit money in their mobile account through any of Safaricom's thousands of agents and then transfer credit from their account to anyone with a Safaricom number via text message. The recipient can then visit any nearby agent to cash out the credit to his account. In many ways, the Safaricom network mimics ATMs in the United States. The ease and convenience of being able to send money around the country instantly and securely was a



Customers in Nairobi, Kenya, visit one of the more than 37,000 M-PESA agents in the country.

large contributor to M-PESA's success. But there was another benefit, as well: open access to banking services.

"Five or six years ago, if you went into a bank as a person in the bottom of the income distribution here, you had basically no chance of opening a bank account," says Jack. "But as long as you've got a Safaricom number and your national ID, which everyone has, you can have an M-PESA account in literally three minutes. M-PESA was not necessarily focused on poor people, but it was certainly made available to them."

M-PESA has found support both among the banked and unbanked in Kenya, but its success in reaching a segment of the population that was previously outside of the financial system is what has brought it widespread attention. Although the value of transactions traveling through M-PESA is lower than the value of those processed in Kenya's banking sector, the volume is much higher, suggesting that there is substantial demand for basic banking services even among those with little money.

The success of mobile payments in Kenya suggests the possibility of a similarly untapped market here in the United States. According to a 2011 survey by the Federal Deposit Insurance Corporation, 8.2 percent of American households, amounting to about 10 million households, had no checking or savings account and were therefore considered unbanked. Another 20.1 percent, or 24 million households, were designated as underbanked — that is, they had a bank account, but had used an alternative financial service, such as a check-cashing service or payday loan provider, at least once per year.

In the Board of Governors survey, the primary reason the unbanked gave for not having a checking account was that they disliked dealing with banks, a sentiment likely exacerbated by the fallout from the recent financial crisis. The underbanked said that the main reason they used payday loans was that they felt they couldn't qualify for a bank loan or credit card. Although on a smaller scale, distrust of banks among the American unbanked mirrors the distrust of banks expressed by poorer Kenyans. Also similar to

M-PESA users in Kenya, unbanked and underbanked individuals in the United States have high rates of cellphone ownership. Among the unbanked, 64 percent have access to a mobile phone and 18 percent to a smartphone. Among the underbanked, the percentages are even higher: Ninety-one percent have access to a mobile phone and 57 percent to a smartphone. There is also evidence from the survey that minority or underserved groups are already adopting mobile payments at a higher rate than the populace at large. Hispanics counted for 21 percent of mobile payment users in the survey but only 13 percent of mobile phone owners.

Elisa Tavilla, a payments specialist at the Boston Fed, suggests in a working paper that the unbanked or underbanked could use mobile prepaid accounts to automatically deposit payroll checks and make purchases and cash transfers, “avoiding or reducing expensive check cashing services, ATM fees, and other charges.”

Getting Information Back

Mobile technology also opens up new avenues of communication between consumers, merchants, and financial service providers. According to the Board of Governors survey, a third of mobile banking users receive text message alerts from their banks, and two-thirds of those users receive low-balance alerts (see chart). These alerts are just one example of mobile technology’s ability to provide instant access to financial information for both banked and unbanked consumers, enabling more informed decisionmaking.

“If I am underserved and I don’t use a regular bank account frequently, before I make a purchase I can check my balance to see if I have enough money there so I don’t overdraw my account,” explains Marianne Crowe, vice president of the payment strategies group at the Boston Fed. “I can set up alerts if I am linked to a bank or even a third-party provider to give me a warning if I go below a certain amount. There are a lot of tools and pieces of information that can help an underserved consumer manage their financial information through the phone.”

The demand for such tools, both from the unbanked and from consumers in general, is real. While credit card use declined between 2006 and 2009, dropping 0.2 percent per

year, debit card payments grew at 14.8 percent per year — in part, it seems, because debit cards allow easier monitoring by the consumer. Hayashi at the Kansas City Fed points to surveys which show that the ability to monitor finances and control spending is the primary reason consumers give for using debit cards to make purchases. Debit cards without overdraft protection provide immediate feedback when a consumer tries to spend more money than he has in his account, as the payment will be declined. Mobile devices, likewise, can provide access to complete account information at the point of sale, allowing consumers with limited resources to make more informed decisions.

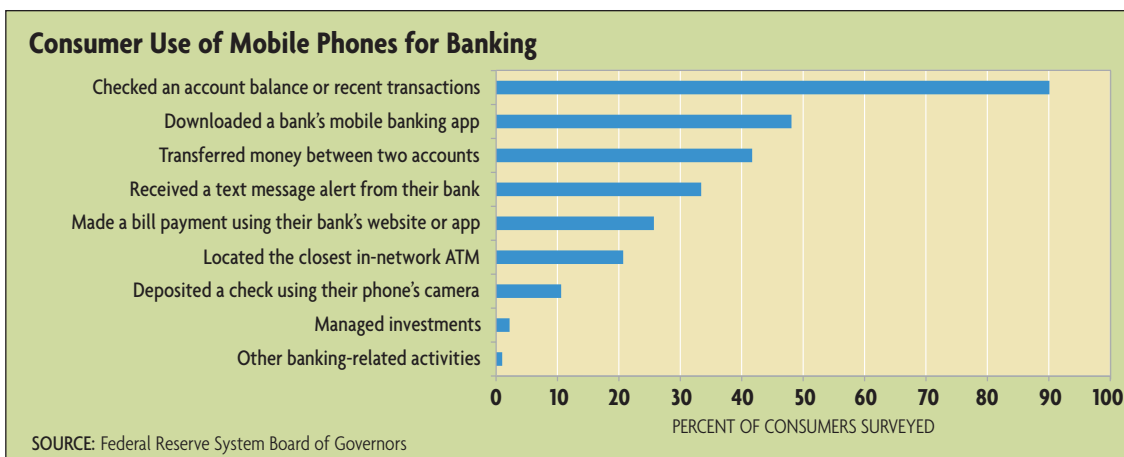
Mobile payment providers, whether banks, merchants, or carriers, are also interested in the smartphone’s ability to access and provide information. The Boston Fed’s Crowe says consumers other than the unbanked won’t be interested in adopting mobile payments if they simply represent another way to make a purchase at the point of sale. Unlike developing nations like Kenya, the United States already has a widely adopted banking and payment network to meet most consumers’ needs.

“Industry participants across the board are looking at the value-added services they can provide to incent consumers to use their phone for payments,” says Crowe. For merchants, those services include offering coupons and discounts that, coupled with GPS technology in smartphones, can detect when consumers are near the store and make offers based on their shopping history. Even nonmerchants see the benefit of integrating product search and information with payments; Google views its efforts to build a mobile wallet as a natural final piece of its search engine, as it “closes the loop” between searching for items and purchasing them, says Hal Varian, chief economist at Google.

Randy Vanderhoof, executive director of the Smart Card Alliance, a nonprofit industry group that promotes payment methods based on smart card technology, says that merchants see many more benefits from mobile phones as payment devices compared to cards as a result of this ability to interact with the consumer.

“The merchants can have kiosks set up at the entry to the building, and as someone walks in, they tap their phone on the kiosk and it registers them into the store. They can then be given offers or notices about specials,” says Vanderhoof.

Although services like these could increase convenience for shoppers, they do raise concerns about privacy. With physical store club cards, shoppers opt in to the program by signing up for the cards and using them at the checkout line. Thus far, mobile apps have



also taken an opt-in approach, but Crowe notes that formal standards may be necessary to ensure consumers are aware of their options.

“Different agencies in Washington and elsewhere are concerned about the privacy factor, and probably somewhere down the road we need to develop standards and requirements so that the consumer not only knows they have the right to opt in to receive these incentives, but also understands that they’re sharing information with the merchant or provider to get these discounts,” says Crowe.

Safeguarding Mobile Money

Developers of mobile payment technology have argued that it offers better security than current card-based payment options. For any substantial purchases, mobile payments offer what is known as two-factor authentication: That is, the user must have both the physical phone and also possess some other piece of security knowledge, usually a PIN or password, to authorize the purchase. Cards also offer this security, in theory, by requiring the user to sign for a transaction as well as possess the card, but the signature is much harder to authenticate at the point of sale. Additionally, online transactions using cards require only knowledge of information on the card itself, which is static. Mobile transactions can take advantage of dynamic authentication, in which data unique to a transaction is used to verify the payment and cannot be used to make other purchases. Nevertheless, some security breaches may be inevitable as the technology gets off the ground.

“While technologies that promise real solutions for securing mobile acceptance are quickly evolving, a number of security risks remain,” says Troy Leach, chief standards architect with the PCI Security Standards Council, a consortium of payment brands involved in establishing security standards for mobile payments. “In the midst of growing deployment of mobile technologies in payments, worries over security may potentially be a barrier to adoption.”

In February, engineers exposed a way to break the PIN encryption in the mobile wallet built into Google’s Android software. Google quickly responded by fixing the security hole and also added new security-related features, such as the ability to disable the mobile wallet remotely from any computer. In addition, consumers can contact the issuers of the cards linked into their mobile wallet to block the accounts, as they would if the physical cards were stolen. Google also notes that payment information is stored on its own secure servers, rather than the phone itself, protecting it if the phone is stolen.

“It’s hard to judge the industry on whether or not it’s secure until we actually get more devices into the hands of consumers and they start using it more frequently,” says Smart Card’s Vanderhoof. “Security is a moving target, and as products enter the market, people with motivations to find weaknesses in them will find weaknesses, and the brands and issuers will have to adjust accordingly over time.”

Vanderhoof and others advocate vigilance, but not at the

cost of slowing development of the technology. Although no national security standards have been established for mobile payments, most industry participants are used to heavy scrutiny from customers and regulators.

“The payments industry is a heavily regulated marketplace, so they are all well aware of the responsibilities they have to protect data,” says Vanderhoof.

Regulators are also watching the market and assessing what consumer protection laws extend to mobile transactions. For mobile wallets such as Google’s that are funded through consumer bank accounts, the behind-the-scenes infrastructure is largely the same as the one currently used for processing card payments and electronic transactions. The Fed’s Regulation E covers electronic fund transfers (ETFs) to and from accounts at financial institutions. This includes ATM and debit card transactions, direct deposits and withdrawals, and online bill payments. Through Regulation E, consumers are only liable for \$50 of unauthorized ETFs if they notify their financial institution within two days of learning about the breach in their account. Similar consumer protections for credit transactions are covered under Regulation Z.

The Fed has indicated that payments are covered by these provisions when consumers use their phones to access linked debit and credit accounts.

“In the ‘back end’ bank-to-bank settlement of these payments, the funds will typically travel on existing payment ‘rails,’ such as the automated clearinghouse system or a card network,” Stephanie Martin, associate general counsel of the Board of Governors, told the U.S. House Committee on Financial Services at a hearing on mobile payments in June. “The settlements between bank accounts over these existing systems are subject to the statutes, rules, or procedures that are already in place.”

The larger regulatory question is whether those same rules apply to nonbank entities providing mobile banking services. For example, PayPal allows users to deposit money. It also offers a form of credit through its Bill Me Later feature, which allows users to pay for items at a later date. But since PayPal is not a bank, it is not necessarily subject to the same regulations that govern financial institutions. According to a review of mobile payments by attorneys Timothy McTaggart and David Freese of the law firm Pepper Hamilton LLP, PayPal states in its user agreement that it complies with the provisions of Regulation E. In fact, PayPal users are not liable for any amount of unauthorized transactions (subject to eligibility requirements) if they notify the company within 60 days of the event.

Vanderhoof notes that PayPal must follow the rules in place governing automated clearing house (ACH) transactions, since its transactions still use traditional payment rails. But as mobile payment startups move further from traditional banking infrastructure, the regulatory guidelines become even blurrier. Such is the case with direct carrier billers, which handle payments by charging the consumer’s mobile phone bill. In her congressional testimony,

Martin suggested that this was an area where the Federal Communications Commission might have authority, but it is difficult to point to one set of rules that cover these types of mobile payments.

“The general consensus is that, yes, things are covered, but there’s no one place that lays out how you are protected in all of these cases,” says the Boston Fed’s Crowe. If a customer has a dispute over charges on his phone bill, such as fraudulent purchases made through direct carrier billing, those disputes are resolved according to the terms and conditions established by the provider, which are not consistent across the board, says Crowe.

“Are the mobile phone carriers as well-equipped as banks to handle customers service issues? I don’t know, but they probably handle things differently. That’s a risk. Some people say that the phone companies are extending credit to customers by allowing them to do this, therefore they should be regulated the way banks are,” says Crowe.

For now, Crowe notes that this type of mobile payment is limited in the United States to low-dollar transactions, such as purchasing a ringtone or mobile apps. In that sense, the risks of payment disputes are lower. But others argue that the volume of these transactions is growing. When an earthquake devastated Haiti in early 2010, the Red Cross established a number that people could text to donate \$10 to relief efforts, which would be charged to the customer’s phone bill. The campaign raised more than \$20 million, representing a substantial extension of credit from phone carriers on behalf of their subscribers.

“If carriers and their intermediaries decide to start letting people bill their mobile phones for much larger, more expensive purchases, then I do think that is something that would require more scrutiny in terms of how that impacts consumers from a risk perspective,” says Crowe.

For the time being, Crowe and Vanderhoof both advocate that regulators pay close attention to developments in the market, but also take a wait-and-see approach to implementing new regulation. Jack notes that in Kenya M-PESA flourished in part because the government remained relatively hands-off during its development. While he cautions that this lesson should not be applied too broadly, regulators and legislators alike in this country have recognized the importance of allowing industry solutions to develop naturally.

The Evolution of the Wallet

Although a hands-off approach to regulating mobile payments is likely to result in greater innovation, that increased activity could also hinder widespread adoption of the technology. Each new entrant into the marketplace may seek to control its relationship with its customers by using its own proprietary payment system, creating compatibility problems. Unlike in Kenya, where Safaricom already had a dominant position in the telecom market, there is no similarly dominant provider in the U.S. mobile market, and conflicting standards of payment set up by competing merchants, card networks, banks, mobile providers, and third-party startups could serve to confuse consumers and delay their acceptance of mobile payments.

Vanderhoof believes that the mobile payment market is likely to coalesce around a few key players chosen by the consumers. Startups will have a difficult time competing against the marketing clout of established brands as well as the trust those companies have built with consumers in existing payment relationships. On the other hand, it is difficult to predict how the market will take shape.

“It’s really kind of early to figure out who the winners and losers are going to be,” says Vanderhoof. “I think there’s going to be a lot of experimentation over the next few years, and we’re probably going to see many names that we haven’t seen before.”

Crowe says the payment strategies group at the Fed will be following developments in the market closely to learn about any potential risks to the payment system. She says that other regulators and government groups are also active in tracking the industry. There is no consensus on which mobile payments offerings will emerge as the market leaders or when paying by phone will become common for shoppers, but most payments experts agree that mobile payments are coming. Jack says the biggest lesson the United States can learn from Kenya’s experience is that demand will drive development.

“We asked people in a survey, ‘What would be the effect of banning M-PESA?’ And 99 percent of people said disastrous or very bad,” says Jack. “So you’ve got to produce something that people really love and for which there is this high demand, this really great need. In the U.S. context, find where that need is, address that need, and address it simply.”

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READINGS

Contini, Darin, Marianne Crowe, Cynthia Merritt, Richard Oliver, and Steve Mott. “Mobile Payments in the United States: Mapping Out the Road Ahead.” Mobile Payments Industry Workgroup paper, March 25, 2011.

Gross, Matthew B., Jeanne M. Hogarth, and Maximilian D. Schmeiser. “Consumers and Mobile Financial Services.” Board of Governors of the Federal Reserve System, March 2012.

Hayashi, Fumiko. “Mobile Payments: What’s in It for Consumers?” Federal Reserve Bank of Kansas City

Economic Review, First Quarter 2012, vol. 97, no. 1, pp. 35-66.

Jack, William, Tavneet Suri, and Robert Townsend. “Monetary Theory and Electronic Money: Reflections on the Kenyan Experience.” Federal Reserve Bank of Richmond *Economic Quarterly*, First Quarter 2010, vol. 96, no. 1, pp. 83-122.

McTaggart, Timothy R., and David W. Freese. “Regulation of Mobile Payments.” *The Banking Law Journal*, June 2010, vol. 127, no. 6, pp. 485-500.