

The future of money

A cash call

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Smart cards and mobile phones are quickly emerging as ways to pay with electronic cash



SOME of the hottest nightclubs have a new trick for checking the identity of their VIP guests: they send an entry pass in the form of a super barcode to their mobile phones. This is scanned by the large gentleman who lifts the velvet rope. Even those who must pay to get in may need their handsets: at a recent clubbers' night at London's Ministry of Sound, students were offered discounts if they used their mobile phones to buy electronic tickets.

Mobile phones are becoming an increasingly popular way to make all sorts of payments. In America fans of the Atlanta Hawks have been testing specially adapted Nokia handsets linked to their Visa cards to enter their local stadium and to buy refreshments. Elsewhere schemes are more advanced. You can already pass the day in Austria without carrying cash, credit or debit cards by paying for everything, including consumer goods, with a mobile phone, says Arthur D. Little, a firm of management consultants. It reckons worldwide payments using mobile phones will climb from just \$3.2 billion in 2003 to more than \$37 billion by 2008.

Mobiles are used to buy lots of things in Asia. Earlier this month Visa and SK Telecom, South Korea's leading mobile company, announced the commercial launch of a phone-payments system aimed initially at 30,000 subscribers. In Japan hundreds of thousands of transactions, from buying railway tickets to picking up groceries, already take place every day with customers passing their handsets across a device like that pictured above. Payments are confirmed with a sound like the bell of an old cash register.

Sending money home

More banking services are also being offered on mobiles. On February 12th, 19 telephone operators with networks in over 100 countries said that people would be able to use their handsets to send money abroad. MasterCard will operate the system in which remittances will be sent as text messages. For people without bank accounts, the credit can be converted into pre-paid cards which can then be used to buy things. "It will revolutionise the money-transfer business," said Sunil Bharti Mittal, boss of Bharti Airtel, one of India's biggest mobile operators. The idea is to tap into the more than \$250 billion a year that immigrants and migrant workers send to relatives and friends back home.

Britain's Vodafone and America's Citigroup are also launching an international money-transfer service developed from the M-PESA remittance service which is already operating successfully within Kenya. Sir John Bond, formerly chairman of the HSBC banking group and now chairman of Vodafone, has long been convinced that payments and mobiles would somehow converge. "Mobile phones have the ability to make a dramatic change to village life in Africa," he says.

He also thinks phones loaded with credit will make many of the payments people use cash for in rich economies. For banks with high infrastructure costs, says Sir John, it has always "been hard to make money out of small payments". But lower-cost business models, some of them from developing countries, are opening up new opportunities. The big attraction of the mobile phone as a purse is that so many people have them—even children.

Buying a train ticket, picking up a newspaper and grabbing a cup of coffee on the way to work with just a wave of your handset promises to be a lot more convenient than fumbling for money and waiting for change, or using a credit or debit card and having to tap in numbers or sign a slip of paper.

Pre-paid or "smart" cards, like those used by Hong Kong's Octopus and London's Oyster for travel on subways, provide a lot of convenience—and for operators as well as passengers, because money is expensive to handle. Transport for London says in the three years since it introduced Oyster, the cards now account for three out of four journeys on the underground and buses. Cash payments for tickets have fallen to just 5%. It has helped to boost usage with differential pricing: tickets bought for cash cost a lot more than using a smart card.

Could retailers start charging more for taking cash? At present the fees merchants pay for taking credit cards lead many to impose minimum limits on what customers can charge. If the fees for using smart cards and mobiles were low enough, cash would be more

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expensive to take, so it might well attract a surcharge.

Both MasterCard and Visa have recently introduced plastic cards in America that do not have to be swiped for purchases under \$25. Later this year a “dual interface” system will be tested in London. It will involve a single plastic card which combines an Oyster for travel, a standard Visa card issued by Britain's Barclays Bank for “chip and PIN” payments and a new “wave and pay” Visa for instant transactions up to £10 (\$19).

Energising Money

The various “contactless” payment systems rely on a technology called “near-field communication” (NFC). The NFC device within the cards reacts when placed close to a reader or touched onto one. The machine induces an electrical circuit in the NFC device, which allows a short exchange of data to effect a transaction, such as deducting a fare from the stored value.

As NFC devices can cost only a few cents they could be inserted into every mobile phone. The idea is that instead of carrying another piece of plastic, just the phone will do. Payments made from those using stored-value are seen as relatively low-risk. Merchants are guaranteed payment and if the cards or phones are lost or stolen the cost to users is limited.

But mobile phones can be much smarter than smart cards. They can be deactivated remotely; they have a screen which can show information, like a credit balance and product information; they have a keyboard to enter information and they can communicate. This means they can also be used to authorise larger payments by entering PIN codes directly on the handset or topped up with stored credit from an online bank account without having to go to an ATM.

How to pay in Tokyo

To see the potential of mobile-phone money, start in Japan. Most Japanese have at least one credit card, but they tend to stay in their owners' pockets. With street crime almost non-existent, cash reigns supreme. Housewives routinely peel off crisp ¥10,000 (\$82) notes to pay for their shopping. Utility bills and other invoices are dutifully taken to the bank and paid in cash, or more likely these days at the local convenience store. Yet despite the popularity of cash, the mobile phone is starting to change even Japan's traditional habits.

For customers in a hurry, being able to pay with their *keitai*—as mobiles are known in Japan—is a lot easier than using cash. Many handsets now perform the various functions of cash, keys, credit cards and ID. Most Japanese consider their phone to be secure; if it is lost or stolen it can be locked remotely to protect the cash, credit and other valuables tied to it.

According to "Mobile Payments and *Keitai* Credit", a new report by Gerhard Fasol, of Eurotechnology Japan, paying small sums with electronic cash is rewriting the rules for the credit-card industry. "We believe that mobile operators, as well as credit-card companies inside and outside of Japan, should consider how to prepare strategically for the likely success of these mobile payment systems," says Mr Fasol.

Accounts can be set up quickly and mostly without credit checks. There are already 500 or so smart-card services in use in Japan and many of these are migrating to mobile phones. Credit can be bought for cash, topped up at ATM terminals or purchased from online banking services. Some cards and phones also double up as employee ID badges and allow purchases at canteens, nearby restaurants and vending machines.

Edy is the biggest contactless-payment method in Japan and is accepted by some 43,000 stores. The system is operated by bitWallet (itself jointly owned by NTT DoCoMo, the country's largest mobile-phone operator, and Sony). Edy accounts for 15m transactions a month, a rate that is doubling annually. It has about 23m users, of which 4.5m are already on mobile phones. The nearest rival is Suica, the brainchild of JR East railway, with over 18m accounts.

Many smart-card systems do not work with each other, but that will change on March 18th when 26 railways and 75 bus companies in the greater Tokyo area will begin sharing a new stored-value system, called Pasma. This too will be available both as a plastic smart-card or built into mobile phones.

What appeals to the Japanese about e-cash is the way it speeds things up. It offers the convenience and portability of cash, but more so. It takes no more than a tenth of a second to complete most transactions. As no change is required, counting errors are eliminated. Fraud and theft are reduced. For the retailer, it reduces the cost of handling money. And because e-cash is smart, it is easy to add extra services. For instance, ANA, Japan's second largest airline, allows Edy users to convert frequent-flyer miles into e-cash.

Many of the *keitai*-credit systems rely on a NFC chip called FeliCa, which was developed by Sony. This chip is embedded in both NTT DoCoMo's wallet phones and the new Pasma system. The chips have to work rapidly and reliably, says Ted Osamura of FeliCa. For instance, the railway operators have insisted that their system can admit 60 passengers a minute through each ticket barrier.

Sony also wants to get its FeliCa chip embedded into computers, televisions and games consoles. That way digital content, like films, music and games, can be paid for easily and without having to enter credit-card details. As the main matches of Japan's budding basketball league are broadcast in paid programmes over the internet, there could be plenty of demand.

NTT DoCoMo is comfortable offering credit because it already sends bills to its subscribers. It knows their names, addresses and bank-account details. It offers two types of credit. One provides a limit of ¥10,000. Approval is instant without a credit check. The other typically starts at ¥200,000 and goes up to ¥1m (with a “gold card” service beyond that). Credit checks could take a couple of weeks, but purchases can be made with just a few clicks on the keypad of the phone.

Stored-credit also allows anonymous payment systems to be offered, just as some travel cards or “pay as you go” mobile-phone services do. These are popular because they are simple and do not involve contracts, even though they might cost more. But the convenience of automatic top-ups and other services may persuade many users to open formal accounts for their mobile phones.

Flashing the plastic

Unlike the Japanese, Americans prefer to use plastic for their purchases. Cards account for more than half of all transactions, up from 29% a decade ago, according to *Nilson Report*, a trade publication. More than 1.5 billion credit cards are stuffed into Americans' wallets. The average household has more than ten.

The infrastructure for mobile-phone payments in America is starting to take shape. The market for pre-paid cards already exceeds \$180 billion and includes telecoms cards, pre-paid cards issued by Visa, MasterCard, American Express and Discover, and gift cards issued by retailers like Gap or Starbucks. Cards are also issued for health-care and government benefits.

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Banks and credit-card firms hope to convert more cash and cheque payments to plastic with new smart cards. Some versions are already very successful. Many Americans use EasyPass, in which drivers pay for highway tolls wirelessly. They are later billed on their credit cards. SpeedPass, a contactless keychain issued by Exxon Mobil, can be used at petrol stations.

Yet compared with the overall market, the new payment systems are still small. John Suchanec, of Bank of America, says that whereas debit and credit cards are accepted at 6m locations in America today, only 1m sites accept contactless cards. The same systems for contactless cards can be used for mobile phones.

Lower fees for shops could speed up adoption, along with the installation by merchants of more readers to take payments. Again the less well-off countries are sometimes the origin of cheaper ways to use the technology. Instead of making a big investment in having lots of electronic NFC ticket-checking devices

at the entrances and exits of stations, Croatia has found that tickets can be bought by and delivered directly to a mobile phone. When the inspector calls, the ticket can be displayed on the screen.

Mr Suchanec says a big opportunity still to be exploited is the “two-way” conversation that mobile-phone systems allow. Banks could send text messages to customers using mobiles linked to their accounts. Coupons or product information could be delivered directly to mobiles as consumers pay for items. This opens up lots of new marketing opportunities, which could underwrite fees.

Art Kranzley, of MasterCard, believes mobile-phone payments could cut down on fraud. His company is testing, with KeyBank, a system that allows a customer to punch his PIN number into a phone before making a purchase, in effect turning the phone into a credit card. Studies by Visa show that the average American consumer is twice as likely to carry his mobile phone as he is to carry cash. For those aged 18-34, the average is four times as likely.

Some of the fastest-growing payment systems already operate online. Banks provide online processing for clients to accept internet payments made by credit or debit card when the customer is not present. But, as Sony hopes, computers can be equipped to do the same thing without giving away credit-card details.

This could prove very popular. One attraction of PayPal as an online-payments system is that neither credit-card nor banking details are exchanged when payments are transferred instantly between account holders. PayPal, which is owned by online auctioneer eBay, now has more than 120m accounts with people in over 100 countries, and claims a fraud rate that is much lower than a typical credit-card firm. PayPal has also begun to promote its own mobile-phone payment services.

With their grip on the market, banks and credit-card firms want to be in a position to collect most of the fees from the users of mobile and contactless-payment systems. But the new systems could prove to be a “disruptive technology”. Banks could be “disintermediated” if, say, the payments for the train ticket, newspaper and coffee made every day by a commuter with his mobile phone appear not on their monthly credit-card statements, but on those of a mobile-phone service provider or an online-payments firm like PayPal.

It is still too early to say whether banks and other financial companies will miss out and if so by how much. A natural division may emerge. Tim Attinger, of Visa, thinks phone companies will not be interested in letting customers charge big-ticket items to their phone bills, because it would require them to take on more financial-risk management and start functioning like banks (which have to deal with customer defaults, collect payments and resolve disputes). And the credit-card firms will want to keep making their new contactless plastic cards (both in and out of phones) easier to use for small payments.

Time to pay up

Much may depend on how bills are settled. Payments associations would lose out if customers pay for goods directly from their bank accounts (whether via mobile phone or online banking services) rather than with credit or debit cards. Banks could try to charge customers for settling such bills online; however in the past such schemes have failed. Some of the smaller banks, which do not have payment-card portfolios to protect, might have the most to gain from offering customers a way to use their mobile phones to pay for items directly from their accounts.

Having spent fortunes on branding, credit-card firms and banks do not want to see other payment systems gain ground. This presents a threat to banks, says Dan Schatt, of Celent, a research company. Historically, banks have controlled both the hardware (chequebooks and debit/credit cards) and the distribution (branches, websites, etc). Mobile-phone banking and contactless smart cards could escape some of their control. Banks could lose customers, says Mr Schatt.

Or will they? Banks and credit-card firms say that if cash is replaced by mobile phones, they intend to be part of the transition. A decade ago some observers predicted that internet banking would render retail banking from high-street branches obsolete. But JPMorgan, Bank of America and others are adamant that people are nowadays using bank branches more than ever. Even if the phone and the smart card replace cash, who gets to collect the fees remains open to contention.

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