

**INFORMATION TECHNOLOGY IN THE BANKING AND
FINANCIAL SECTORS**

MARCH 25, 1996

**BACKGROUND BRIEFING PAPER OF THE
TELECOMMUNICATIONS INFOTECHNOLOGY FORUM**

(please attribute any quotation)

Information Technology in the Banking and Financial Services Sector

Smartcards, banks and telephones

A brief historical introduction; what this suggests about the future

Banks first started using computers linked to telecommunications systems in a big way in the 1970s and 1980s, when local area networks allowed them to start automating accounts—and thus to introduce automatic teller machines (ATMs) which customers could use to find out how much money was in their accounts and make cash withdrawals.

ATMs appeared to offer two things:

- A competitive advantage: better service for customers.
- Savings on staff costs, as tellers were replaced with machines.

The first of these is undoubtedly true. A network of ATMs operating 24 hours a day takes the necessity out of planning when to get money for individuals—it is hard to imagine anyone accepting a bank without an ATM network for their day-to-day financial needs (though judging by the queues in some banks, some people do not seem to have realised quite what can be done with an ATM card).

The second, however, has not really happened, at least in the way it was originally imagined. What has happened is that on the one hand staff have been freed up for other things—such as handling the huge array of financial services banks now offer compared with a couple of decades ago—and on the other IT has taken on a life of its own as banks think of new ways to wire themselves and their customers. In Hong Kong this has meant people being able to pay everything from their electricity to their tax bill by phone—just press in the numbers—or pay for goods with money direct from their accounts—the EPOS system, now widely available. Although banks still talk about reducing the number of their branches—perhaps in Hong Kong because of its aggressively high rents, rather than staff costs—this does not appear to be happening (those queues again).

With further technological advantages banks can now take ATM cards a step further—enter the smartcard, a card with a chip on it, that can store much more information on it, and do much more with this information. The world's best-known smartcard is Mondex.

Tell me about Mondex. What is it, apart from a portentous name?

Mondex is a smartcard system that aims at replacing cash, developed by British banks NatWest and Midland (owned by HSBC) and telecoms operator BT. Most of its technology is developed by Japan's Hitachi, which manufactures the card's chips and balance readers. Transactions are handled off-line—with the money being stored on the cards and transferred off them direct to another party. In theory the card will also be able

to do all sorts of other transactions: giving other cards money either through an accompanying electronic wallet, down telephone lines or via personal computers.

Mondex is being tested in the English town of Swindon, with 30,000 people, and many shops, car parks and phone boxes wired to handle the card. New uses for the card are being added, the latest being local buses in January this year.

Just this month (March 1996) computer company Unisys and card and related equipment maker Keycorp joined the party, signing an agreement with Mondex to provide servers, card readers, point of sales equipment and the software needed to use all these.

BT plans eventually to stop using conventional phonecards and replace them with smartcards. If Mondex takes off, then it would probably be linked to this system.

Is it going to happen anywhere outside a dismal West country town, last heard of making steam engines about 150 years ago?

Europe is leading the way at the moment—for two reasons. First, telecommunications costs are far lower in the USA, so there is less commercial pressure for companies to develop a means of off-line transaction there. And second, credit cards are ubiquitous in the USA—and competition makes them cheap.

Interestingly France is leading the way in Europe, with about 85% of all the smartcards there; perhaps that investment in Mintel systems was worth it.

What about Asia?

Mondex is also getting a fair amount of international exposure, not least through HSBC, which has plans to get the system running through Hongkong Bank and Hang Seng Bank (both of which it owns) in 1997, or maybe earlier? Hongkong Bank is also currently talking with Bank of China in Hong Kong about getting it in on the party, and also has rights to franchise the system in other countries around the region. China is another likely advocate of some form of smartcard. Its Golden Card project is the most ambitious of all its various Golden projects aimed at building a nationwide series of information networks. The Chinese government's motive for rolling out these networks is principally because it believes it can gain greater control over even the most far-flung corners of the country. That is to say, it takes very seriously the idea that telecommunications will soon be distance insensitive—officials will be able to monitor and control events in Guangdong as well as in Beijing.

Could smartcards make cash and/or credit cards redundant?

Smartcards could replace cash for many transactions involving small amounts of money. But then you have to ask what is the disadvantage of cash. Why carry a card around when you can carry a few hundred Hong Kong dollars? Fair enough, but why are credit cards so useful? The answer is they aren't if you don't travel a lot. A card which can deduct money straight from your account (such as Hong Kong's EPOS) works very well, and involves none of the extra costs of a credit card (the insurance, the risk of forgetting to pay your bill on time and having to hand over all that interest, etc). Combined with cash, readily available from an ATM on your same card, it is possible to see how a smartcard could fall flat on its face.

Where credit cards come into their own is going abroad, where a Visa card, MasterCard, American Express or Diner's Card saves all the hassles of having to change money, apart from small trivial amounts for taxis, cups of coffee, etc. And the transaction cost is small.

What about phone cards? Well, what about mobile phones? Which threatens phoneboxes more?

Think about it: what makes a smartcard attractive? Lower transaction costs—important where you have to pay for phone calls for verification (eg Britain), but less so where local calls are free (eg Hong Kong). And just think how much the minimum charge is when you stuff a credit card into a phone in an airport. In the latter case the competitive advantage a smartcard would offer would be cost: no need to verify the card, and so incur the cost of making the phone call to the card centre.

Then there is the business related to loyalty cards, ie cards tied to stores—Marks & Spencer, Lane Crawford, Park N Shop, Wellcome. In Britain, loyalty cards are proving popular and successful with merchants, particularly when they are tied in to special offers. One organization that is doing particularly well in this area is the Cooperative Society—which not only is as a chain of stores, but also is a bank: the perfect tie in for a smart card.

Could smartcards make banks redundant?

Not at their core business—lending money. But what about retail services? An electronic cash system such as Mondex does not require a centralized clearing facility to handle transactions: the "money" goes direct from card to recipient.

Does this threaten jobs in banks? Not necessarily—look at automatic teller machines—as mentioned above, their introduction freed up staff to do other things. (Ironically, smartcards could make ATMs redundant: if you can load your card at home—or indeed anywhere—through a telephone/computer, then you would not need to go out onto the street and push it into a machine.)

Also, remember that people will still want to do something with their money: it will not earn interest on a card. Smartcards are ideal for regular small cash transactions, and the occasional large one.

Could smartcards—or at least the technology they incorporate—make banking centres redundant? Or: Are Hong Kong's days numbered? And if they are, why should Shanghai benefit?

Here the answer is to think of what consumers want, rather than what they need, and what are the facilities that will provide this.

Shanghai is building a brand new stock exchange building in Pudong - replacing its current stock exchange, housed in the former ballroom of a colonial hotel - as part of its bid to reestablish itself as the financial centre of Asia. Ironically, the reason the current exchange can operate at all, despite the makeshift nature of its facilities, is because it is a highly wired exchange—trading is electronic, so it does not need a trading hall at all, let alone the building of large, new premises. Most people who trade on the exchange do so

from remote sites—though ones still in Shanghai. Of course, they need not be in Shanghai, but that is where people want to be. In other words, the technology alone will not determine what people want and set out to achieve. If Shanghai does emerge as a financial centre it will be because people believe they can do business there. (In much the same way, it is not technology that has made companies move out of Central in Hong Kong to other areas, but technology that allows them to. What has driven them out—or persuaded them to leave—is above all high rents.)

Smartcards and privacy; or could smartcards make governments redundant?

If information can be stored on a smartcard, why would it need to be stored elsewhere? Take, for example, medical information about an individual: if this could be stored in a card, and only accessed by a hospital when someone visited a doctor there, not only would the individual be able to visit any hospital near at hand when they needed to (say on holiday) but their privacy could be preserved.

Looked at another way, transactions direct from one card to another would be untraceable—privacy would be protected, but so would illegal acts, such as money laundering, as would legal transactions liable to be taxed. Issues here include the amount of money that could be stored on a card (Hongkong Bank is in discussion with the Hong Kong Monetary Authority on this issue concerning Mondex cards). Also, who else would be able to get access to money. Would it be much easier to transfer it to another country and take advantage of better interest rates? Would tax evasion become an even bigger problem if people could transfer money at will around the world without governments being able to track them?

Wired magazine has speculated that on-line gambling could be the killer entertainment application of the future: already this is happening. Football magazines in Asia advertise betting in Europe that can be conducted with a credit card: at least such transactions go through the bank that issued the card and so could be subjected to monitoring; if the transaction was done directly with a smartcard there would be no separate record.

Similarly without restrictions on currency transfers (and there are few in many countries: the biggest being the impracticality of changing money—ie a trip to the bank, plus the transaction fees) then it is possible to see how individuals using smartcards tied to computers and automated currency trading could deal fruitfully on forex markets.

(An interesting point to bear in mind is that taxation has traditionally been tied to things governments can easily find, ie property and jobs—patches of land and factories cannot move, therefore it is easy for tax officials to locate the owners and take taxes off them; electronic commerce is far harder to monitor: someone living in Britain, say, could trade on the Hong Kong stock exchange, realize capital gains and dividends, without the authorities in Britain either being aware or even being in much of a position to find out.)

The probability is that a lot of governments would want to regulate the use of smartcards very closely. Indeed it is this possibility that makes them so attractive to the Chinese government. In a closed system this would seem a possibility. But how closed will future systems be? Could a country restrict access? Given China's growing integration into the international economy it would certainly have to accept payments from smartcard networks, and the desire to transform cities like Shanghai into international banking

centres means that sooner or later China's ability to police channels of funds transfer will be undermined. This would effectively end a country's ability to pursue a domestic monetary policy independent of world market forces.

Can, or should, a Government attempt to put off the day when it has to abandon specified monetary goals? Imagine also an Internet packed with virtual malls where some people could only window shop—why? Because their government told them so.

Is on-line security really an issue?

If someone is cracking the code of your smartcard, or intercepting your credit card number, yes security is a problem. But how many of us already cash in our pockets ready to be picked, and easily give our card numbers to merchants and by telephone and by mail without further thought? Probably the greater risk issue concerns legally binding transactions, such as commercial contracts, letters of credit, etc. Encryption technology is the sophisticated way to tackle the problem, cryptographic technology the simplest, and possibly the safest, but maybe not sophisticated enough for the major commercial deals. Visa International and MasterCard are racing each other to establish an industry standard for encryption, Visa in conjunction with Microsoft and MasterCard in a pact with Netscape. He who controls the little black encryption box controls the monopoly rent or royalties on every little transaction that passes through the network. (Mr Rupert Murdoch had similar ideas for cable TV in China!). Cryptography or 'blinding' technology is less exciting but rather more practical for the average consumer. The cardholder registers with the issuer and receives a PIN number in exchange. The PIN enables the issuing bank to certify an electronic payment or e-cash without reference to whom it was issued. E-cash becomes as anonymous as paper money or coins. The European-based DigiCash, is an example. The European Commission has sponsored its own version, CAFE. Mondex and other smart cards use similar principles. Its as safe as houses, which of course get broken into from time to time.

What telecom facilities are banks looking for?

High-speed 64 Kbps and above, all the way to 2 Mbps, readily leased circuits with lots of redundancy, packet switching and frame relay, compensation service agreements and above all a telco that goes out of the way to serve the customer. Not much really, oh but just one more thing. A regulator that permits the bank to self-provision, by-pass, callback and anything else. In short, telcos and the regulator should treat the banks with the same flexibility and understanding that the banks have traditionally shown their own customers ... no, rephrase that, just like the banks are *learning* to treat their own customers.