

E-Money and Implications for Emerging Countries

by Setsuya Sato

INTRODUCTION

Not a single day passes without reading a column or two in the newspapers written on the emergence of innovative electronic money and banking products. These payment and banking innovations all have different product names: smart cards, electronic cash, electronic purse, cybercash, digital cash, etc. Sometimes the words describing these products are ill-defined and used interchangeably, though each product is designed to serve different purposes.

These innovations are broadly grouped into two categories: Internet banking and smart cards. Most commerce over the Internet is done with credit cards. We simply type our credit card number into the merchant's World Wide Web (WWW) page payment form and wait for our purchase to be shipped to us. The only thing that needs to pass between the merchant and the buyer is the credit card number.

The problem is it's not that simple. The Internet is an open network without built-in security provisions. People have legitimate fears about sending their credit card number through the Internet. Because of these fears, methods are

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being developed to make purchasing products on-line more secure. One model goes one step further and issues a digital token, or digicash, meant to replace physical cash.

Internet banking is mushrooming in the U.S. As many as 30 banks are offering on-line banking services to check account balances, to transfer funds between accounts, and to schedule bills to be paid. One bank, Security First Network Bank, does not have a physical branch and provides banking services only through the Internet—complete virtual banking.

Smart Cards

Another type of innovation is called "smart cards." A smart card is typically made of plastic and is about the size of a credit card. It contains micro-chip processors, instead of a magnetic strip. These cards carry electronic money as a substitute for cash, and can be used for small retail purchases, telephone calls, public transportation and a host of other small value transactions.

Today's smart cards can easily store several pages of data in 1K to 8K of memory, and perform a variety of routine calculations. It is anticipated that this capability will increase several magnitudes, allowing storage of hundreds of pages of data and calculations of complex formulas without much variance from today's costs. A 64K chip card is in research and development at the time of writing.

These shifts in technical growth will create myriad new products and services, allowing a financial service provider to offer a customer a full and complete summary of their relationships and calculations with enhanced financial management. For example, account numbers and latest transactions and balances can be stored on a card, along with information needed to apply for mortgage or home equity loans. The scheduled repayment of these loans will also be stored on the card and provide a consumer with convenient ways of repayment.

It is worth mentioning that the two technology trends are beginning to integrate. Chip updating will be accomplished through devices like home phones with smart card readers, personal computers, and issuer-owned kiosks or automated teller machines.

What services will these new payment and banking products provide? What is the prospect for the use of electronic money in emerging countries? Will E-money provide emerging countries with opportunities to leapfrog existing systems or will it raise new concerns, or both? These are the issues we are going to address in this short article.

SMART CARD IS NOT NEW

The smart card is not new technology. French journalist Roland Moreno is widely credited with inventing the smart card in 1974. Moreno's worldwide patents covered the concept of

embedding a microcontroller into a regular bank card. Moreno's vision was that one day we would all carry a smart card that would be the electronic equivalent of a personal organizer and an electronic bank manager.

The other visionaries in the card industry accepted his concept enthusiastically. The concept promoted discussion within the French government, the finance, public transportation, medical and telecommunications sectors, and began a series of technological trials. The most noted trials, from a banking perspective, were those conducted by Carte Bancaire (the French Bank Card Group) in Blois, Caen and Lyon between 1982 and 1984. The trials tested the technology and its economic viability in a "live" situation. Part of the test included the establishment of a definitive standard. The trial was a technical success. The financial institutions in the rest of the world monitored the French experiment. One country, Norway, thought the technology could solve a major business problem they were trying to address.

A consortium led by Bergen Bank initiated a smart card trial in a suburb of Oslo. The problem in Norway was remote payments, but on-line solutions were very expensive because the costs of telecommunications were high due to Norway's geography. The smart card looked attractive because it could carry out the required secure functions off-line. Following the trials, the French and Norwegian banks launched their smart card programs. Today these applications form the largest smart card-based banking systems operating in the world. (France has issued 21 million smart cards; Norway, 1.2 million.)

Today, almost every industrialized country has had trials of stored-value cards and on-line electronic payment products. Moreover, the undertaking of E-money trials is not limited to industrialized countries: many emerging and developing countries are also experimenting with smart card systems. Industry journals

report a growing number of pilot E-money experiments in numerous parts of the emerging world: Zambia, South Africa, Nigeria, Russia, CIS, Brazil, Latvia, China, Indonesia, Thailand, Lebanon, Guatemala, Chili, Portugal and Taiwan. Usually, the application of cutting-edge technology is first developed and marketed in industrialized countries. Less industrialized countries tend to monitor and follow technology trends. But this is not the case with E-money. At the moment E-money's acceptability and reliability has not been proven in industrialized countries. However, emerging countries are looking toward E-money as a viable solution for payment system problems, though E-money is not entirely trouble-free. Among such pilots, the experience in South Africa and Nigeria provides some useful insights.

SOUTH AFRICA

In South Africa, telecommunications infrastructure outside major cities is poor. Electricity service, when available, is often disrupted due to electrical storms. Over 23 million South Africans do not have electricity. Vast numbers of people live in informal settlements. The prepaid smart card is proposed as a useful payment instrument to meet the demands of the low-income population.

The South African banks have been developing prepaid smart card systems for some time. Three of the four major commercial banking groups in South Africa have run trials or developed systems. The Nedcor Group developed an electronic purse application called Megalink (or Universal Electronic Payment System). The cards were marketed to the large customer base who did not hold credit cards. The system offered a range of banking services including balance inquiries, mini-statements, and inter-bank and inter-account funds transfer. The First National Bank of South Africa (FNB), with the Foundation for Africa Business and Consumer Services, ran a prepaid smart card trial in 1992 in Bloem-

fontein to test applications for taxi fare payments. Nearly 200,000 taxis in South Africa are more like mini-buses and are licensed to carry up to 14 passengers. The taxi cab proprietors were pleased with the tighter controls the system offered because it reduced the amount of cash at risk in the system. The Amalgamated Banks of South Africa (ABSA), the largest banking group in South Africa, installed a prepaid smart card system in 1990 at the Rand Park Golf Club near Johannesburg.

Later, these three banking groups (Nedcor, FNB and ABSA), with the Standard Bank, the other major commercial banking group, formed an inter-bank group to produce a national electronic purse standard. This standard has now been agreed upon and is open to smaller banks and retailers. The four banking groups handle 90% of the retail banking business in South Africa.

The proposed uses of the Interbank Electronic Purse is multi-purpose. It will cover small value transactions (transport, telephone, newspaper and vending), large value transactions, and specific applications for transport and medical industries. A principal driving motivation is to access the "unbanked," low-income people who do not qualify for credit cards. It is being done by promoting deposits of pay checks through the cards.

The poor telecommunications infrastructure and the high theft rate at ATMs drive the need to develop an electronic cash alternative. The initiative includes two products: an off-line debit card and an interbank electronic purse with a PIN-protected, stored value balance for large purchases, transfer of funds and cash withdrawals. For small value payments, both products will contain a purse accessible without a PIN. Both products will support the non-banking applications of prepaid electricity since the majority of consumers will use prepaid meters in the future. Cardholders will be able to reload at special bank terminals

installed at retailers or by depositing cash at a bank teller's window. ATMs will be retrofitted to accept reloads.

NIGERIA

The problems in Nigeria are poor telecommunications, high theft and high inflation (above 50% per year), which escalate the cost of cash handling and security. Payment alternatives such as checks or credit cards do not exist even for business payments, and large cash transactions over Naira 10 million (US\$125,000) are not uncommon. Attacks on bank branches, gas service stations and retail outlets handling cash are reported regularly. A typical bank branch would normally handle and process as much as Naira 40 million per day.

To overcome these problems, Allstates Trust Bank developed a strategy to introduce the Electronic Smart Card Account (ESCA) to eliminate the use of cash for small and large value payments. Since the available terrestrial telecommunication service was not reliable for banking data transmission, the decision was made for Allstates Bank to develop a proprietary, VSAT-based, intra-bank communication network to connect its 21 branches.

Allstates Bank issued the ESCA card initially to high net worth account holders (individuals, businesses). Up to Naira 16 million (US \$200,000 compared to a per capita GNP of US\$1,250) is downloadable to the ESCA card at any bank branch, and is used for retail and business payments and cash withdrawals. Merchants' daily collections are uploaded to the merchants' accounts through the card.

The pilot trial began in December 1995 with a limited number of high net worth individuals and merchants. The national rollout began in November 1996 and 1,600 cards have been issued.

An effort was undertaken to obtain regulatory approval from the Central Bank of Nigeria.

Allstates Bank had to educate the Central Bank staff about the concept and functionality of the smart card. Official approval was given in August 1996. As the next step, discussions are being held to invite participation in the ESCA scheme from a consortium of 16 banks.

IMPLICATIONS FOR EMERGING COUNTRIES AND THE WORLD BANK

What are the implications of E-money for emerging countries and the World Bank? From the previous examples, it becomes clear that E-money will provide emerging countries with opportunities to solve part of their payment and banking problems. At the same time, the recent trend of applying sophisticated technology in payment and banking is raising concerns. First, technical solutions should be considered only when the desired benefits are well-defined. As we have learned, each E-money model is designed to resolve a different problem. It is critical to rigorously define the business case before any investment choice is made.

Second, the unique nature of emerging country problems may mean that E-money may be used in ways uncommon in developed countries. For example, the usage may not be restricted as a medium of exchange for small-value transactions. This may mean that the issues of money laundering, counterfeiting and seignorage losses would be more significant in emerging countries.

Third, there is a need to monitor carefully ongoing pilot trials in developed and developing countries, to evaluate the pros and cons of each pilot, and to understand the level of user acceptance.

The European Union announced that it would restrict issuance of the electronic purse (as well as Internet payments) to banks. The U.S. regulators, meanwhile, will initially take a more liberal, "let the market find the solution" approach, allowing non-banks to issue the

electronic purse. It is difficult to judge which is the preferred option, but in the case of emerging countries, a cautious approach may seem more appropriate. In Finland, the Central Bank established a subsidiary for the development of a smart card (Avant). After the successful completion of the trial, a consortium of Finnish banks has been invited to develop the next generation smart card (Avant II) to be applied nationwide. One can argue that the Central Bank should demonstrate a strong initiative and leadership particularly in emerging countries, including the possibility of the Central Bank issuing its own electronic currency.

Most important, there is a need to evaluate the prudential implications of E-money. I do not have to emphasize that E-money is privately issued "money" and will not carry the government guarantee that currency carries. The monetary amount stored on a card or on a network is only as good as the bank or other organization with the ultimate liability is able to pay on that obligation. This concern will become significant as higher-value systems emerge, and as options for reloading of cards and third-party transfers of liabilities are introduced.

The Central Bank of the Netherlands developed a checklist to obtain information on the implementation of E-money schemes with respect to: the characteristics of the schemes; the institutional and organizational setup; the legal aspects; the issuing, accounting and administrative processes; float management; and security, technical and infrastructure features.

The Dutch approach also includes the following minimum requirements as part of the normal supervisory framework.

- The management of the issuing institution and the operator of the scheme should possess the requisite competence and integrity.

OPTIONS FOR E-MONEY

- Reporting and capital reserve requirements are applicable.
- A sound legal basis should be established where rights and responsibilities for all parties are well-defined and communicated.
- The issuing institution should enable the Central Bank to extend its supervision to scheme operators, if not banks, and to subcontractors.
- Relevant international professional standards, such as accounting and security standards, should be applied.

NEXT STEPS

What are the next steps for emerging countries and the World Bank to enjoy the benefit of

payment and banking innovations? First, we must fully understand the mechanics and functionalities of various E-money models, including how they work, their advantages and disadvantages, before we discuss policy implications, since each product is designed to serve unique purposes.

Second, we must carefully examine a number of issues and concerns the advent of new electronic payment methods are raising because current laws and regulations do not clearly cover the use of smart cards and on-line payments.

This includes the following issues:

1. The traditional concerns of government and central banks about monetary policy, competition between regulated depository and nondepository institutions, and law enforcement against financial crimes such

as money laundering, tax evasions and fraud.

2. Whether balances on smart cards or on-line accounts will be subject to reserve requirements or deposit insurance, or will be covered by consumer protections laws.

3. Technology and security, such as data encryption techniques, tamper-resistant micro-chips, and interoperability of various products.

Today, we are seeing an application of information technology to payment and banking on an unprecedented scale. This trend will certainly benefit emerging countries by offering an opportunity to leapfrog existing constraints. However, we need to make sure that the use of information technology is creating a robust, secure and reliable operating environment to meet business needs.