

Electronic Banking For the Poor

Panacea, Potential and Pitfalls

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Please submit comments on this paper to David@MicroSave.Org

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Acronyms used in this report

ATM	Automated Teller Machines
ASP	Application Service Provider
EFT	Electronic Funds Transfer
EMV	Eurocard / MasterCard / Visa
LAN	Local Area Network
GSM	Global System for Mobile communications
PDA	Personal Digital Assistant
PIN	Personal Identification Number
POS	Point Of Sale machines
WAN	Wide Area Network

Electronic Banking for the Poor: Panacea, Potential and Pitfalls

David Cracknell, *MicroSave*

Executive Summary

Why Electronic Banking?

Electronic Banking brings the potential to extend low cost virtual bank accounts to a large number of currently un-banked individuals worldwide. Change is being driven by falling costs of technology, by competition and by the ability of electronic banking solutions to offer customers an enhanced range of services at a very low cost.

Whichever technical option is chosen the development of an electronic banking solution should consider the customer perspective – the customer value proposition; the institutional perspective – the business case; and the local environment for electronic banking.

Technical Options

Technologies used in electronic banking include, but are not limited to:

- *Personal Digital Assistants*: Used by microfinance programmes to automate record keeping.
- *Automatic Teller Machines & Point of Sale Devices*: Used in conjunction with Magnetic stripe or Smart cards.
- *Magnetic Stripe Cards*: Low cost cards operated through a magnetic stripe on the reverse of the card.
- *Smart Cards*: More expensive chip based cards that can store information off line on the embedded chip.
- *Cell-phone banking*: Banking through cellular phones, either through menus or through SMS.

Customer Perspective – The Value Proposition

An electronic banking solution must provide sufficient value to persuade the customer to move transactions away from cash. However, cash is an incredibly versatile medium of exchange. It is universally recognised as a store of value; and it is accessible, portable and divisible.

- *Features*: What needs does the e-banking solution meet? What features encourage the user to maintain an electronic account in preference to cash? For example, improved personal safety and the ability to transfer value from person to person.
- *Accessibility*: Limited distribution of transaction points strongly reduces the value proposition to the customer. Walking many kilometres to access services is inconvenient and costly. Saturation of an area with the service is preferable to a wider thinner, distribution.
- *Affordability*: Cash is inherently “frictionless” there is no charge that gets levied each time value is transferred. Given this, start up and transactional costs need to be as low as possible for both the end user and the merchants these users frequent.
- *Ease of use – convenience*: The e-banking solution needs to be simple to use, fast and user friendly.

Institutional Perspective – The Business Case

From an institutional perspective, the electronic banking solution should increase profitability. This means careful consideration of functionality, business volumes, fees and charges, efficiency gains, development costs, partnerships, and distribution channels.

- *Functionality*: The level of functionality that the institution wishes to develop, whether this should be narrowly or widely focused.
- *Building volume through segmentation*: By careful development of different business segments the financial institution is able to build transaction volume through the core e-banking infrastructure.
- *Fees and charges*: Developing an appropriate revenue strategy is heavily influenced by the functionality offered, the segments served and the anticipated volume of transactions.
- *Efficiency Gains*: The financial institution is able to handle substantially increased business transactions without corresponding investment in physical infrastructure.

- *Controlling development costs*: Costs must be controlled during the development phase to ensure positive returns on investment.
- *Partnerships*: Multiple business partnerships are essential in building a multi-functional e-banking solution and in supporting the distribution network.
- *Distribution network*: The distribution network must meet customer requirements for accessibility, ease of access and widespread functionality, whilst meeting institutional cost requirements.
- *Developing multiple business cases*: Each partner involved in the solution must benefit, whether through reducing costs, increasing efficiency, increasing turnover, or through direct income.

The Environment for Electronic Banking

Many e-banking projects are developing in South Africa. This is not the result of chance, but rather that the South African environment is more favourable for electronic banking. There are well-developed banking and retail sectors, a supportive central bank, good communications and a generally positive policy environment. The environment for electronic banking is influenced by the:

- *Evolution of the financial and retail sectors*: The nature of the financial and retail market in which the solution is being launched is a key determinant of product features, interoperability, potential volume drivers and basic financial literacy.
- *Level of financial literacy*: The level of financial literacy influences communication of the product, the nature of the distribution channel and the nature of transactions made.
- *Regulatory and policy environment*: The regulatory and policy environment should be supportive of electronic banking. This includes appropriate banking regulations and communications, security, and information policies.

Testing an Electronic Banking Solution

The development of an electronic banking solution is far from easy it will have considerable impacts upon the financial institution. Risks during development and design must be carefully managed.

- *Institutional capacity*: The financial institution will require new technical competencies in order to run the e-banking solution. New functions like risk management, call centres and relationship managers may be necessary. Existing functions such as treasury management, internal audit and marketing may need to be strengthened.
- *Managing development risk*: The development phase carries considerable risk that the solution will not be developed as anticipated or will run over cost.
- *Pilot testing*: Whilst pilot testing may demonstrate the product to the competition, it represents the final opportunity to make changes to the design and/or implementation of the product.
- *Research*: The pilot test phase provides an opportunity to research client acceptance of the product, to refine marketing and communications to test the suitability of the distribution infrastructure and to test assumptions in the business case.

Options for Microfinance Programmes

Developing an electronic banking solution will be beyond the capacity of most microfinance programmes. However, with a good back office system, the MFI can consider a number of options. These include:

- *Personal Digital Assistants*: Using PDAs to improve loan processing and data collection (e.g. SafeSave in Bangladesh)
- *Credit scoring for micro-loans*: Using scorecards to improve credit appraisal for new and existing customers.
- *Microfinance programmes as issuers of their own cards through a wider initiative*: In this case, microfinance programmes do not need to develop their own back office systems. (e.g. Opportunity Bank operating with Malswitch in Malawi)
- *Microfinance programmes operating low-end closed loop ATM systems*: A relatively low cost ATM system can be built (e.g. Prodem in Bolivia).
- *Groups of Microfinance programmes implementing a focused programme*: In this case development costs are shared (e.g. Ferlo-MEPS in Senegal).

The Case for Donor Involvement

Donor subsidies need to be carefully applied. The Virtual Conference on Electronic Banking for the Poor (Feb 2004) derived the following general principles.

Principle 1: Donor subsidies should focus on building shared infrastructure and consider scalability.

Principle 2: The recipient institution should cover the recurrent costs of the e-banking initiative.

Principle 3: A careful cost-benefit analysis should be conducted before an e-banking initiative is launched.

Principle 4: There is a considerable amount that can and should be learned from the successes and failures of existing and previous initiatives. Donors should document this experience.

Principle 5: There is a potential role for donors to help governments understand and develop appropriate policy environments in which electronic banking initiatives would flourish.

Principle 6: Donors can invest in promoting e-literacy.

Introduction

Why Electronic Banking?

Electronic Banking brings the potential to extend low cost virtual bank accounts to a large number of currently un-banked individuals worldwide. Change is being driven by falling costs of technology, by competition and by the ability of electronic banking solutions to offer customers an enhanced range of services at a very low cost.

E-Banking Technology

Technology and communications enable electronic banking. Options include personal digital assistants, ATM machines, magnetic stripe cards, smart cards and cell phone banking. This paper briefly considers the options available, but does not attempt a detailed comparison of the different technical options.

Customer Perspective: The Value Proposition

For electronic banking products to succeed they must consider how their product meets the expressed needs of their customers. To meet the needs of the poor the value proposition must consider product features, accessibility, affordability and ease of use.

The Institutional Perspective: The Business Case

For the financial institution the business case for e-banking needs to be strong. Simply put there must be a profit. Profits are attained from developing an e-banking solution that can host products targeted at different segments and thereby build sufficient transaction volume to generate sufficient fee income to cover costs. To ensure transaction volumes a distribution system must be carefully designed and implemented. Multiple profitable partnerships will be required to ensure accessible, easy to use products.

Environmental Factors

An appropriate environment makes developing an electronic banking solution much easier. The environment includes the degree of evolution of the financial and retail sectors, the extent of financial literacy and the policy and regulatory environment.

Developing an E-Banking Solution: Research and Pilot Testing

Once the solution has been designed from the customer perspective and delivered in a given environment it needs to be tested both technically and for viability. During this phase research is undertaken on how to best deliver and support the product. A structured approach to pilot testing ensures that development risks are managed appropriately and that appropriate products are delivered to the market at a minimum cost.

Electronic Banking and Microfinance

This paper is targeted mainly to institutions that have the resources and capacity to invest in large-scale electronic banking solutions for the poor. Although developing an extensive e-banking solution is beyond the range of most microfinance programmes, a range of options is presented where microfinance programmes can become involved.

A Role for Donors

Donors can play a role in developing an appropriate infrastructure for electronic banking. The paper explores principles to guide donor involvement in this sector.

Electronic Banking Technology

There are a number of options facing institutions thinking about investing in electronic banking for the mass market, these include: ¹

- a) Personal Digital Assistants to automate loan officer operations
- b) ATM machines & POS
- c) Magnetic Stripe Cards ... often referred to as “magstripe”
- d) Smart Cards
- e) Cell-phone banking

Frequently debit card and smart card options are integrated with Automated Teller Machines (ATMs) and Point Of Sale (POS) devices.

Personal Digital Assistants: An increasing number of microfinance programmes are introducing personal digital assistants (PDAs). PDAs are small handheld computers that can run specialized programmes to manage MFI and client records. More information on PDA's is available in Charles Waterfield's article in the CGAP innovation series.

Automated Teller Machines: ATMs are associated with magstripe or smart cards. Experimentation with graphical user interfaces and talking ATMs, such as at PRODEM, combined with falling ATM prices² are bringing ATM technology to larger microfinance programmes that can accept client deposits. ATMs can be fully functional teller machines that accept deposits, dispense cash and can be programmed with other functions. Or they can be cash dispensers only.

ATMs are expensive to own and operate but offer the financial institution a much cheaper way of processing withdrawals than through over the counter operations. ATMs are typically online, therefore, require reliable and affordable communications and power.

“Magstripe Cards”: Debit cards, often based around magnetic stripe technology, allow customers online access to their accounts through a network of POS devices and ATMs. The principle advantages quoted by proponents of Magstripe cards are low price and the requirement that transactions are performed online. The requirement for online transactions means that geographic outreach is determined, in part, by the availability of reliable and affordable communications and power.

“Smart Cards”: Smart cards have a machine-readable chip embedded in the card. This chip is able to store detailed transaction records offline and perform transactions without a link to the customers' account. In order to do this, value is stored on the chip by the customer and is periodically reloaded, over the counter, through ATM machines or through POS devices.

The principle advantages quoted by proponents of the Smart Card are security and offline functionality. Biometric security allows a cardholder's picture and fingerprints to be stored on the card and used to identify the user. More information on biometric security is available in Stephen Whelan's article in the CGAP innovations series. Disadvantages include the cost of the card and risk of loss of value on losing the card. Counterweighted by move to pre-authorized debit where cards are loaded 'on-line' but transact 'off-line' which allows reconciliation of approved transactions.

Eurocard, MasterCard and Visa are currently introducing a new standard (called EMV) whereby all Visa, MasterCard and Eurocard branded cards will be issued with a magstripe and a smart chip. Whilst this offers security advantages, it could significantly increase the cost of any mass market solution which relies upon the Visa or MasterCard distribution network.

¹ The paper does not attempt to provide a detailed technical overview of the options available, nor to get involved in a detailed argument over which option is most suited to which circumstance.

² ICICI Bank in India is also experimenting with a very low cost ATM machine, which dispenses pre counted packets of money.

Mobile phone banking: The phenomenal expansion of mobile phone networks in Africa and other parts of the world provides an opportunity to operate virtual bank accounts through mobile phones, either through menu driven systems or through SMS technology which is already being used by millions. This option has the significant advantage that the distribution infrastructure is already in existence – millions of mobile phones.

Box 1: Personal Digital Assistants at Safesave Bangladesh

Personal Digital Assistants at Safesave in Bangladesh

“SafeSave is experimenting with Palm Pilot handhelds for field-level transaction entry. The handhelds are hot-synced to the branch office database (MS Access) by USB connection, which takes no more than a few seconds. The experiment has been running for 12 months.

The handheld in use is the Palm "Zire," which is inexpensive (about \$100) and seemingly durable. The handhelds simply act as a collection sheet in the field, and hot-syncing replaces the need to type transactions into the MIS manually.

The direct expense for a two-year experiment, involving two branches and ~3,000 clients, will come to \$15,000. Paper and manual data entry are comparatively cheaper, but the handhelds provide for better internal control and a more professional image. The system is so far proving popular with both staff and clients.

Fieldworkers with a primary level education are proving quite capable of operating the handhelds in the field.

Slow technology uptake may in part be due to the lack of impact on direct operating expenses (paper and data entry are cheap in our operating context). For SafeSave, using Palm Pilots looks expensive until we take indirect expenses and indirect benefits into account. These variables are hard to quantify, and doing so requires a strong understanding of activity costs, internal control needs and service issues, along with the ability to articulate these things to MFI management. Without this, it may prove difficult to convince management to incur the heavy startup costs.

For SafeSave having our door-to-door collectors use Palm Pilots for transaction recording provides benefits to both clients and the MFI:

(To SafeSave) **better use of staff time:** eliminating 3-4 hours per day of data processing gives branch managers more time in the field to spot check accounts and promote our services

(Clients) **faster loan processing:** in paper branches can only guarantee loans within 2 working days, because we need a day for data entry. In the Palm Pilot branches we can guarantee loans by the next working day.

(SafeSave) **better adherence to product rules:** the Palm Pilot double checks minimum savings requirements and ensures that loan interests are paid before savings withdrawals and loan repayments occur.

(Both) **better account accuracy:** the Palm Pilot requires the correct passbook balances before allowing transactions, so passbooks that don't reconcile with the database get fixed quickly.

Cost savings is not really the big driver - direct expense per transaction is likely to be at least as much as paper and manual data entry. But internal control and service gains will likely make Palm Pilots worthwhile”

Mark Staele writing during the Virtual Conference on Electronic Banking for the Poor

Source: Virtual Conference on Electronic Banking for the Poor

The Customer Perspective - The Value Proposition

An electronic banking solution must provide sufficient value to persuade the customer to move away from cash³. However, cash is an incredibly versatile medium of exchange. It is universally recognised as a store of value; and it is accessible, portable and divisible. It has taken millennia to evolve into its current paper form, from crude coins whose value was determined by silver or gold content to complex notes with multiple devices to combat forgery.

So what are the important drivers of the value proposition to the customer⁴?

- *Features*: What needs does the e-banking solution meet? What features encourage the user to maintain an electronic account in preference to cash? For example, improved personal safety from reducing cash carried.
- *Accessibility*: Limited distribution of transaction points strongly reduces the value proposition to the customer. Walking many kilometres to be able to access the service is inconvenient and costly. Saturation of an area with the service is preferable to a wider thinner, distribution.
- *Affordability*: Start up and transactional costs need to be as low as possible for both the end user and the merchants these users frequent. Cash is inherently “frictionless” there is no charge that gets levied each time value is transferred.
- *Ease of use – convenience*: Simple to use fast and user friendly. Wealthier individuals are prepared to accept a fee for convenience. Low value users will accept greater inconvenience to save money or to facilitate low value transactions.

Features

Many early electronic banking initiatives were designed to reduce the cost of transactions for the financial institution as much as to deliver value to the customer. However, an electronic banking solution can be designed as a low cost bank account on a card or telephone, facilitating cash withdrawals and cash back transactions, deposits, payments and transfers. Added value services can be provided such as loyalty programmes, person-to-person transfers, airtime top up and government payments. Common features offered by electronic banking products are detailed in Table 1.

Table 1: Common Features Offered by Electronic Banking Products

Accessibility	
ATM	Withdrawals and deposits, account transfers, money transfers, purchase of airtime and bill payments.
Merchant network	Ability to use solution to make purchases at merchants
Visa / Maestro issuing	Cards branded Visa or Maestro (or MasterCard) enabling the cards to be used throughout the Visa or MasterCard infrastructure.
Cash back	The ability to withdraw cash from the card through a merchant network
Person to person transfer	The ability to transfer funds onto the card
Third Party Deposits	The ability to deposit money into the card through third parties e.g. Post Offices
Ease of Use / User Training	
Uniformity of service	Services are provided in a standardised manner regardless of point of service
Assistance at service points	Assistance can be provided by the merchant or through assisted service points

³ In this paper cash is taken to mean notes and coins, rather than near cash substitutes like cheques etc.

⁴ Adapted from a contribution to the Virtual Conference on Electronic Banking for the Poor by Ron Webb, Paynet Kenya

Transparency	
Statement Printing	A statement showing recent history on the electronic account is printed on request
Balance Enquiry	A balance enquiry either prints the account balance or shows it on a screen
Transaction Receipt	A receipt is printed by the ATM or POS device following the completion of the transaction
Security	
PIN based verification	Verification of the user through use of a secret numerical code called a Personal Identification Number.
Biometrics	Using finger print or iris scans to verify the identity of the user
Photograph	A photograph of the user is often printed on the face of the card
Value Added Services	
Air time top-up	The ability to transfer value from the card to a mobile phone
Money transfer	Transferring money typically from one card holder to another
Bill payments	Paying bills electronically usually for utility payments
Web enabled	Internet access to the e-bank account
Call centre	A call centre provides a mechanism to initiate transactions such as direct debits and enables lost cards and problems to be reported and resolved.
Electronic Funds Transfer (EFT)	Electronic funds transfer allows electronic payments into an e-banking account

Accessibility

Stuart Rutherford (2002) has shown the poor to be sophisticated users of financial services. Although there may be an age bias in the acceptability of e-banking solutions (Balachandher, undated), practical experience has demonstrated that there the bias towards paper based record keeping, in developing markets, is far lower than might be expected.

- Central Africa Building Society (CABS) in Zimbabwe was moving off passbooks to a mag-card solution and experienced initial resistance from customers. Its banking halls were filled with long queues of customers waiting to transact on a passbook. CABS introduced new teller counters that only serviced mag-card users. These counters had short, quick queues. The customer base voted with its feet and the building society eliminated passbooks within 9 months. This for circa 400,000 customers. A year later customers did not even see it as an issue. (Ron Webb, Virtual Conference Participant).
- Research by Teba Bank, in the rural and small town market in South Africa shows a reversal in demand patterns. While a few years ago the demand for book-based accounts was very high and demand for card-based accounts relatively small, the opposite is now true. This is encouraging as the rejection of card-based accounts in favour of books was thought to be a major obstacle to banking this market electronically. (Chantal Storbeck, Virtual Conference Participant)
- *MicroSave* studied the competitive environment in Uganda and found that 70% of survey respondents who did not possess a plastic card wanted one. The most common reason given was the ability to transport cash safely and to increase access to cash. (Wright and Rippey, 2003)

E-banking has the potential to provide accessible, convenient financial services because it no longer requires a bricks and mortar infrastructure, operated by the permanent staff of a financial institution. E-banking uses an electronic infrastructure and in many cases relies upon third parties to originate transactions. However, partners in an e-banking initiative differ in nature, in location, in accessibility for the poor and in the functionality they are able to provide. These factors are explored in Table 2.

Table 2: Location of Services

E-Banking Partners	Location	Accessibility for poor	Probable Functionality	Some Potential issues
Post Offices:	Rural and Urban	High	Pay in, Withdraw, Payments ⁵ Transfers.	In many countries Post Offices have been traditionally favoured by poorer people but have lost custom due to poor customer service, poor products and manual procedures. E-banking enables Post Offices to standardise the provision of services, whilst significantly reducing back office processing.
Banks:	Largely urban	Low-Medium	Deposits, Withdrawals, Transfers	Historically many banks offered low accessibility to services for poorer people. E-banking allows greater accessibility through ATM networks.
E-bank ATM kiosks:	Mainly urban	Medium	Pay in, Withdraw Transfers Payments Airtime top up	Staffed ATM kiosks allow wider provision of services and enable users to receive advice from customer service staff.
Petrol Stations:	Major highways	Medium	Payments	Although petrol stations have a network across a country, they are situated on major highways. Cash handling facilities (such as drop boxes), may make it difficult for some petrol stations to provide cash back facilities.
Merchants:	Urban and semi rural	Medium-High	Payments Sometimes Pay-in or cash-back Transfers	Understanding the actual cash flow patterns of the target market is necessary in designing the merchant network. The business case for merchants needs to be carefully constructed to ensure transaction volume during the launch and rollout of the e-banking solution.
Internet kiosks:	Urban and semi rural	Medium	Payments, transfers and sometimes deposits and withdrawals	Internet kiosks can be used to make payments and transfers and in some countries where banking regulations – take cash deposits and withdrawals.
MFI / SACCO / VB	Urban or semi rural	Medium	Payments, Pay-in, Withdraw Transfers	MFIs / SACCOs and VB have greater rural outreach than banks, but still do not serve every rural area.
Person to Person:	Phone / POS depending on strategy	High	Transfers	The ability to transfer cash between account holders is likely to transform domestic money transfer arrangements, particularly within families.
Bus or rail:	Transport routes	High	Transactions	Ideal for smart card based transactions where value is maintained on the chip.
Call Centre:	Anywhere from a telephone	High	Queries, setting up regular transactions	Likely to have limited functionality and therefore, part of a wider solution.
Cell-phone banking:	Anywhere where there is a network signal	Medium – High	Payments and transfers	Requires minimal additional infrastructure, works wherever there is a network signal. Accessibility could be limited by literacy required to operate a menu driven service and need to withdraw cash.

Affordability

Customers on low incomes should find the transactions affordable. Charges need to be designed around a greater volume of low value transactions, probably charging customers a fee per transaction rather than a percentage per transaction, as is the case with Visa and MasterCard. For certain value added transactions

⁵ Transfers can include person-to-person transfers. Payments can include payments for goods and services, utility payments, repayments of loan instalments.

like person-to-person money transfers where alternatives are much more expensive (see for example Sander 2003) it should be possible to charge a premium.

Ease of Use

Systems should be simple to use, fast and user friendly. Service should be standardised so that wherever the solution is used the customer is familiar with the procedure followed. Customers should have ready sources of advice, whether this is through call centres, through publicity or through physical presence (see Box 2)

Mini Case Study: Standard Bank's E-Plan⁶

Standard Bank launched the E-Plan account in 1994 under its own brand. The E-Plan was designed to be an easy to operate electronic bank account, largely focused around cash withdrawals. It offered a competitive interest rate and other benefits – like death benefits. It operated through two purses that allowed both transactions and savings in one account.

E-Plan was designed to operate through ATM machines that had simplified menus. ATM machines were housed in kiosks that were staffed by personnel chosen for their communication skills. These staff assisted customers as necessary and provided authorisation for transfers between savings and transactional accounts.

The E-Plan account proved very successful and by 1996 had reached half a million customers served through only 12 dedicated outlets, though the account could operate through any ATM nationwide. On the basis of this experience Standard Bank made the decision to bring the E-Plan account in house. This had the advantage that E-Plan account holders could access to a broader range of products and services. It had the disadvantage that the simplified menu's had to be dropped.

Rapid growth in the E-Plan account continues. Currently the E-Plan account reaches more than 3 million South Africans. Standard Bank is now rolling out a similar E-Plan product in Kenya, starting with staffed ATMs in Uchumi supermarkets.

Box 2: Mini Case Study: Standard Bank's E-Plan

The Institutional Perspective – The Business Case

From an institutional perspective, the electronic banking solution should increase profitability. This means careful consideration of functionality, business volumes, fees and charges, efficiency, development costs, partnerships, and distribution channels.

- *Functionality*: The level of functionality that the institution wishes to develop, whether this should be narrowly or widely focused.
- *Building volume through segmentation*: By careful development of different business segments the financial institution is able to build transaction volume through the
- *Fees and charges*: Developing an appropriate revenue strategy is heavily influenced by the functionality offered, the segments served and the anticipated volume of transactions.
- *Efficiency*: Through handling an increasing volume of transactions electronically the financial institution is able to handle substantially increased business from the same physical infrastructure.

⁶ For more on the E-Plan account see Paulson (1998) and Porteous (2004)

- *Controlling development costs*: Costs must be controlled during the development phase to ensure positive returns on investment can be generated.
- *Partnerships*: Multiple business partnerships are essential in building a multi-functional e-banking solution and in supporting the distribution network.
- *Distribution network*: The distribution network must meet customer requirements for accessibility, ease of access and widespread functionality.
- *Developing multiple business cases*: Each partner involved in the solution must benefit, whether through reducing costs, increasing efficiency, increasing turnover, or through direct income.

Functionality

There is a continuing debate over the level of functionality that should be provided by electronic banking solutions. Established commercial banks with a large brick and mortar infrastructure and expensive, legacy based banking systems have made huge proprietary investments in electronic infrastructure, in back office systems, and in ATMs and merchant networks. Newer banks with a lower investment in physical infrastructure benefit more from falling development costs for back office systems and the rapidly reducing cost of communications, of ATMs and of POS devices.

“Existing branch delivery systems, which absorb more than half the operating capital and define the organizational structures of most banks, represent an important incentive to maintain the status quo. As a result despite major investments in technology, banks have avoided the strategic restructuring needed to establish less costly, more customer-friendly distribution channels, leaving non-bank financial service companies to establish leadership in the electronic delivery of financial information.”

William M. Randle quoted in Stegman (1999)

This dynamic is setting the scene for some interesting confrontations and debates not least in South Africa.

“Due to government pressure, the big banks are working on a special product called the National Bank Account. One of the key features is that it will be accessed through a card which can be used on any of the ATMs of any of the participating banks, using the same pricing, i.e., no additional switching costs. This is a product that is being carefully designed to ensure that it does not cannibalise the banks’ existing low income market products and will therefore have very limited functionality and a low maximum balance. The assumption of the big banks is that one cannot profitably provide a cheap product with high functionality to the low income market.”

Jennifer Hoffmann, Managing Director, Teba Bank, South Africa

One debate is then whether to provide a low cost, lower featured product to prevent cannibalisation of services targeted to the high value market, or whether to provide a feature rich product whose profits are driven by lower fees and relatively higher transaction volumes. Table 1 provides a list of common features that can be offered by electronic banking products.

Segmentation

Segmentation within an e-banking initiative is one key to profitability. Segmentation implies using the e-banking platform to sell differentiated services to different groups of customers. Segmentation allows financial institutions to match customers with optimal products and delivery channels. However, as the profit potential and the cost of serving each segment differ, it may be necessary to serve several highly profitable segments in order to build the infrastructure to support a mass-market solution. Some of the most obvious segments include:

Own customers: An existing customer base is the most obvious market segment for electronic banking. Clearly, extending electronic services to existing customers risks cannibalizing existing products and

services. Against this, is the expected benefit to be gained from decongesting banking halls and processing transactions at a lower cost.

Distributors: Business to business use of electronic banking allows the transfer of value between distributors and their customers, without the physical transition of cash. This considerably reduces the risk to distributors. Brewers and distillers in South Africa and Tanzania are using electronic payments.

Loyalty cards: Fuel companies are the most obvious customers for loyalty cards. The fuel card is usually either co-branded with the financial institution, or simply branded by the fuel company. The fuel company is normally the issuer of the card. The e-banking solution is also used to transfer funds between the fuel company and its distributors as each delivery is made.

BP in Malawi approached Malswitch to create the BP fuel card. The fuel card is primarily targeted at public and private institutions operating transport fleets. Removing cash reduces cash related fraud for the institutions, and reduces the cost of cash management for the fuel company. The fuel card solution also offers the advantage of placing Point of Sale devices throughout a fuel company's network of petrol stations at a minimal cost to the financial institution.

Other options for loyalty programmes include larger retail chains and student bodies. In Kenya, the supermarket chain Nakumat aims to increase customer loyalty through offering a points scheme based on the amount purchased using a Smart Card based solution.

Government: Governments typically make a number of transfer payments. These include, pension and benefit payments. In South Africa pensions are already being paid to more than 5 million clients through Smart Cards.

Corporate salary payments: Given falling ATM prices, employers in Africa are being targeted for a new service. On site payroll processing through ATM machines. Ron Webb of Paynet elaborates:

“Paynet in Kenya is actively targeting traditional pay-packet wage operations to replace them with on-site ATM services. Paynet's financial model shows that this can be achieved in a cost effective manner where both employee and employer wins. The employer by reducing administrative overhead and cash risk and the employee by providing an electronic "banking" service where the employee decides when and how much cash to draw. The employee benefits by being able to choose how much and when to take money home, thereby reducing their risks. The mag-card card based service acts as a seed point for additional services - loan application (perhaps alongside an employer scheme), money transfer, bill payments (embryonic yet) and mobile recharge. It is also has great status value.”

Community phones: Community phones take mobile phone technology into communities, usually under the brand of the mobile telephone company. The telephone company Cell C has teamed up with Teba Bank to enable Cell C community kiosk operators to manage their prepaid accounts. Kiosk operators can deposit funds in their Teba Bank A-Card accounts in Post Offices, Teba Bank branches and major supermarket chains and can top up their airtime at any time.

Microfinance / Credit Union Cards: Microfinance programmes or Credit Unions can operate an advanced electronic solution through partnership with a financial institution, or through a collective approach.

Fees and Charges

Modelling the success of an e-banking product depends on accurately predicting the behaviour of customers towards the product Assumptions must be made by each segment for ATM usage, POS transactions, the percentage of transactions that are on our network, that are off our network etc.(see Table 3) The challenge is that many variables are difficult to predict before the solution is in operation at which time considerable sunk costs have been invested.

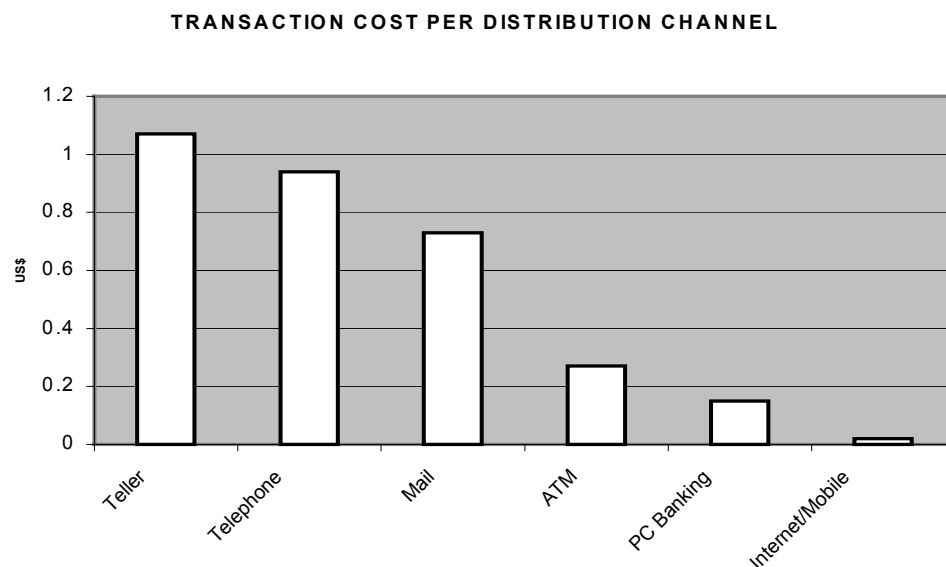
Table 3: Pricing E-Banking Services

Variable	Description
Pricing by transaction type	Each type of transaction that can be performed using the card needs to be priced
# Transactions by type per month	Each type of transaction generates different revenue and cost streams and therefore need to be tracked separately
% Dormancy	Some cards will be heavily used while other cards will remain dormant.
Communication costs	Charges for GSM, leased line, VSAT communications
“Off Us” costs	Additional fees paid for use of switch infrastructure
% “On Us” usage	Percentage of total transactions occurring over owned infrastructure
% “Off Us” usage	Percentage of total transactions occurring over other banks infrastructure
# POS Transactions by type	Point of Sale transactions by type of transaction
# ATM Transactions by type	ATM transactions by type of transaction
Virtual balance	The virtual balance maintained on the customers’ card could be an important variable where the financial institution attracts significant volumes of transactionary balances that it otherwise would not retain. Furthermore, experience by Standard Bank of South Africa, shows that it is possible to create and market an electronic savings account holding longer-term balances.
Marketing costs	Costs for marketing and communicating the solution to end-users can be considerable depending on the marketing approach taken.

In framing assumptions it is important to remember that in many developing countries “cash is still king”. This was clearly demonstrated in Zimbabwe, where electronic transactions mushroomed during a recent shortage of cash in circulation and fell back rapidly as money supply was increased. In one recently launched debit card in East Africa the number of ATM transactions was significantly underestimated and the number of Point of Sale transactions correspondingly over estimated.

Increasing Efficiency of Operations

Electronic banking can significantly increase the efficiency of transaction processing. This is clearly demonstrated in figure xx (Ketley and Duminy 2003), which shows that typical ATM transactions are a fraction of the cost of teller transactions.



Source: BAI

Figure 1: Illustrative costs per distribution channel

Source: Quoted in Ketley and Duminy 2003

In terms of usage of space, decreasing transaction volumes within banking halls enables more space to be devoted to generating sales and providing advice to customers. This can be clearly seen in figure xx (Ketley and Duminy 2003).

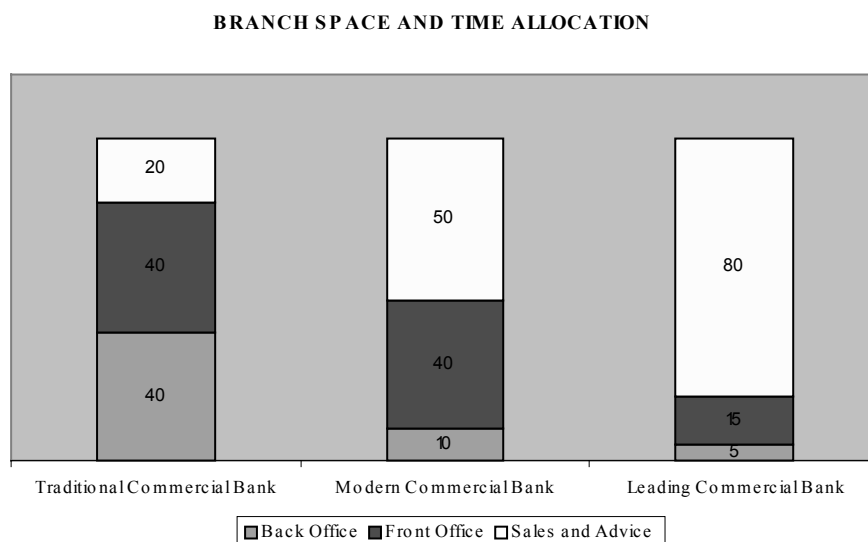


Figure 2: Illustrative branch space and time allocation

Source: Quoted in Ketley and Duminy (2003)

Controlling Development Costs

Any technology-based project is at risk of significant cost overruns and electronic banking is no exception. Careful control of costs is vital if an e-banking project is to be viable.

Fortunately, cost dynamics are changing in Africa with the introduction of low cost ATMs. ATMs are now available at US\$10,000 a machine, compared with an earlier price of US\$35,000. Prices of Point of Sale devices are also falling and they are increasing in functionality.

Another factor in cost control is the nature of the relationship that a financial institution has with the developer of an e-banking solution. Teba Bank in South Africa developed its systems through a Joint Venture agreement with its solution providers. While it is difficult to say conclusively, the joint venture agreement appears to have encouraged:

- *Cost control:* A small, focused development team has kept development costs low. The focus on cost control has included purchasing and reconditioning several high-end servers which enable one or more servers to be offline at any time and provide disaster recovery at a very low cost.
- *The development of a feature rich product:* Teba Bank's A-Card is a fully featured solution offering functionality equivalent to a bank account with additional functions not available through a normal bank account including airtime top up and card-to-card transfer.

Distribution

Crafting a distribution strategy is at the heart of the any electronic banking solution. Developing a mass-market distribution network means moving beyond upmarket retailers, restaurants and hotels populated by credit card holders, to reach less wealthy debit-card holders. According to Ketley and Lipschiltz (2004), the following factors are influencing the distribution strategies of the major South African Banks:

- *Falling communications costs and GSM:* The latest generation of POS devices can be battery operated and operate on GSM networks. This allows POS devices to reach much more remote areas.

- *Increasing EMV⁷ compliance*: Major banks are upgrading their acquiring infrastructure to be EMV compliant and accept chip-based cards.
- *Product and service convergence onto one device*: The ability to sell a range of products from a single POS device changes the economics of the merchant in hosting the device and may increase the profitability of the acquiring business
- *Falling costs of technology*

A host of questions needs to be answered before an appropriate distribution strategy can be designed. What type of infrastructure can be put in place? Where should the infrastructure be placed? How should infrastructure development be phased? Should distribution be fully or partially outsourced, can the infrastructure be franchised? Should the solution be online or offline? Is there a sufficient business case for each partner in the distribution infrastructure?

Box 2: Options for managing a distribution network

Options for managing a distribution network

Fully outsourced: A fully outsourced model is the easiest model to operate. Daily reconciliations are required but the outsourcer handles cash management, network management and vendor management. However, it is also likely to return the lowest profits.

Partially outsourced: Under partial outsourcing the technology partner provides the switch but the financial institution owns the ATMs / POS. The technology partner can provide vendor management, reconciliations and switch management

Owned and operated: Under an owned and operated solution, the institution takes on all operations, including vendor management, reconciliations, card management and switch management. This option makes many demands on the institution and requires the hiring and retention of highly skilled and experienced staff.

Unfortunately there is no one correct answer to these questions as the answers depend on many inter-related factors including the competitive environment, the availability of technical resources, the availability of capital and the strength of the different business cases.

Partnerships

Except perhaps for the larger banks or in the case of solutions with tightly defined functionality, e-banking solutions require a partnership approach to achieve scale. Partners in an e-banking solution include, application service providers, banks, communications providers, merchants – groups of merchants, government departments, Post Offices and/or Postbanks, microfinance institutions, petrol stations, transaction processors etc.

Table 4: Functions and Challenges in a Partnership Approach

Partner	Function	Challenges
Application Service Provider	Provides technology backbone for the project, ensures appropriate interfaces with other partners, ensures security of system. Can provide additional functionality depending on distribution strategy chosen.	The technology solution provider is a critical initiator of an e-banking solution. In some cases this can result in a proprietary system being established (such as Malswitch).
Banks	Provides a legal backbone of the system as the holder of the virtual deposits .	If competing banks have existing ATM, smart card or cellular solution they may be unwilling to collaborate on the development of new systems.
Communications providers	Provide access to communications infrastructure.	Limited rural outreach of communications infrastructure.
Groups of Merchants	Provide the POS device infrastructure	Legal status of merchants as deposit takers

⁷ EMV – is shorthand for Eurocard, MasterCard, Visa three of the major credit / debit card issuing organisations, who together set common standards for international cards.

Partner	Function	Challenges
	to enable Smart Card, Debit Card and some mobile phone based transactions.	uncertain in some countries. Using merchants to provide cash back may lead to month end liquidity crises (more research on actual systems needed here).
Government Departments	Provide volume base for mass e-banking solution, through payments of pensions, benefits, salaries etc.	An e-banking solution will rely on government information systems, and the ability of government departments to communicate carefully to their benefit or salary recipients.
Individual Merchants	Likely to provide access in more remote locations.	Support for individual merchants, business case for individual merchants.
Post Office / Postbanks	Provide rural access – potential for integrating into existing post office products – such as money transfer and to offer a faster more efficient service.	Many Post Offices in Africa have poor systems or are in locations without access to a GSM signal. (In this circumstance is an offline solution preferable?)
MFI / NGOs / CBOs / SACCOs	Provide rural access – MFIs can use the e-banking solution to collect loan repayments, money transfer and to accept deposits (though not to hold them).	MFIs may have to be of a sufficient size to offer a sufficient critical mass of potential customers to participate in a larger e-banking initiative. However, it may be possible for MFIs to collaborate effectively together to form joint solutions, as is being attempted by Ferlo MEPS in Senegal and by HP in Uganda.
Petrol Stations	Provide rural access. However, many petrol stations in developed markets already provide some access through ATM machines located on the premises.	Legal status of petrol stations as deposit takers uncertain in some countries. May not want to accept cash, which would increase their cash in transit risks. Likely to be more interested in their own loyalty programme version of the card than in providing additional services. May be resisted by some service station staff due to decreased opportunity for intentional fraud.
Loyalty Programmes	Enables specific groups to be targeted using specific features or pricing infrastructures. Specific examples could include petrol station cards, youth cards, store cards etc.	Single function loyalty programme cards are unlikely to be used across the range of features possible on the debit card. So they may not be hugely profitable as a product line in themselves, but are likely to increase the profitability of the distribution channel through increasing transactions.
Transaction Processors	Enable different types of transactions to occur, adding functionality and interoperability to the e-banking solution. Transaction processors can add switching and reconciliation facilities. Application service providers sometimes provide these services as part of their business model.	Security and control issues that relate to transaction processing are a specialist discipline.

IT Vendor or Strategic Partner?

A critical partnership is that between the system developer and the host bank. A vendor relationship is based on a transient relationship, where the vendor and the host financial institution can have very different objectives. In a partnership, a longer-term relationship is envisaged with both parties working towards common objectives. For example, Teba Bank in South Africa structured a partnership with its system developer, Celltransact, to create a joint venture in which both parties benefit from the success of the solution. As a consequence, it can be argued that the combined team has delivered an extremely flexible, cheap to operate product at a fraction of the cost of some competing solutions.

Developing Multiple Business Cases

Each partner in an electronic banking solution has to have a firm business case in favour of the solution. While providing a service that the end user values, the financial institution must satisfy the requirements

of a range of different partners each requiring slightly different benefits from electronic banking solution. These benefits and costs are outlined in Table 5 below.

Table 5: Developing Multiple Business Cases

Developing Multiple Business Cases		
Partner	Benefits to Partner	Costs to Partner
Individual Customer	More convenient services	Transaction fees, monthly fees
Technical Service Provider	Fee income or profit share	Development costs
Communications providers	Transaction based income	Communications costs
Merchants	Increased sales when solution to scale Air time top up Cash back fees	Recording of business transactions enabling taxation Transaction fees POS terminal rental
Government Departments	Cost savings Decrease in fraud Decrease in payment processing time Improved record keeping Enabling taxation	Training cost Communications costs
Postbank / Post Office	Fee income Reduction in costly back office procedures	Training cost Possible cannibalisation of existing financial services
MFI / NGOs (where Partners)	Cost savings New sources of revenue New or improved services to customers	Issuing costs Training cost Transaction fees POS terminal rental
Distributors	Improved cash management Decreased fraud Real time payment at time of delivery	Issuing costs Training costs Transaction fees Point of sale rentals
Petrol Stations	Improved cash management Decreased fraud Increased customer loyalty Increased sales in attached shop	Issuing costs Marketing costs Transaction fees Point of sale rentals Record keeping for card holders
Loyalty Programmes	Increased sales through increased customer loyalty	Issuing cost Training costs Marketing costs
Transaction Processors	Fee income	Requirement for increased infrastructure

The Environment for Electronic Banking

Many of the examples quoted in this paper are from South Africa. This is not the result of chance, but rather that the South African environment is particularly favourable for electronic banking. There are well-developed banking and retail sectors, a supportive central bank, good communications and a generally positive policy environment. The environment for electronic banking is influenced by the:

- *Evolution of the financial and retail sectors:* The nature of the financial and retail market in which the solution is being launched is a key determinant of product features, accessibility, transaction volumes and financial literacy.
- *Level of financial literacy:* The level of financial literacy influences communication of the product, the nature of the distribution channel and the nature of transactions made.
- *Regulatory and policy environment:* The regulatory and policy environment should be supportive of electronic banking. This includes banking regulations and appropriate communications, security, and information policies.

Evolution of the Financial and Retail Market

Electronic banking initiatives are more likely to succeed in evolved financial and retail markets. There are a number of reasons to suppose this. While scale is required to cover costs, the business case for electronic banking in developing countries strengthens significantly with the significant fall in the price of ATMs and POS devices and improving communications infrastructure. With scale comes a number of advantages

- When there are a large number of card (or other solution) users in a population the problem of financial literacy is significantly reduced... children teach their parents how to use the card.
- Initial concerns relating to trust are likely to be overcome
- The case for merchants to hold POS devices improves significantly as the volume of cards in circulation grows

Scale increases the case for interoperability. In 2004, in Kenya there are three major ATM networks. run by Standard Chartered, Kenya Commercial Bank, and Barclays. There are two operators of independent switches: Kenswitch and Paynet. While the three banks are all members of Kenswitch, they have currently opted out of allowing Kenswitch-based transactions through their ATMs. The major banks may lose a key competitive advantage, in the short term, by granting access to their ATM machines. However, in the longer-term the business case may change as the more numerous smaller banks rollout interoperable ATMs.

The development of retailer structure is also a factor in e-banking success. In South Africa, with its developed retailer infrastructure, the bank and retailer can enter into a strategic collaboration to offer services through the retailer's existing POS network. Hence, Teba Bank in South Africa is able to offer depository services through Shoprite and Checkers Easy Pay scheme. As e-payment systems gravitate towards more formalised retailers, who can provide transaction income to the bank, the concern is that this could effectively exclude the poorest people and the smaller businesses associated with them.

Experience in many markets suggests “cash is king” for most segments of society. Given this, outlets focused on dispensing cash—whether through ATMs or through POS cash back—are likely to be significant drivers within any business model. ATMs may increase card sales to the point that other channels become cost effective. However, many merchants will find it difficult to become a sole source of cash back where there are no other outlets.

As financial and retailer infrastructure develops, markets become more attractive to Visa and MasterCard. Collectively Visa, MasterCard and Euro Card set industry standards for compliance, security and fraud protection. Financial institutions can be *issuers* or *acquirers*. An *issuer* is able to issue a credit or debit card with a Visa or MasterCard logo--this certifies that the card can be used on the Visa or MasterCard network. An *acquirer* is able to accept other banks' Visa or MasterCard branded cards on their network of ATM machines and POS devices.

Visa or MasterCard *acquiring* rights is a key component of the business case for the distribution infrastructure as a whole. Firstly it means that merchants can accept any Visa or MasterCard branded card in their POS device, not just the cards of the participating bank. Secondly, it means that the bank can earn transaction-based income from its distribution infrastructure through switching the transactions of other banks cards.

Level of Financial Literacy

The nature of marketing electronic banking for the poor is likely to be significantly different from the marketing employed for other products and services, in that it will include a greater emphasis on financial education.

To benefit from the solution, users need to understand:

- *How to use the cards*: Where revenue streams are dependant on transaction based income, it may be more important to ensure customers are familiar with the multiple ways in which a card may be used than to simply increase the number of card holders.

- *Where to use the cards:* Clear branding that is easily communicated to both literate and non-literate clients is a prerequisite to informing customers where the cards can be used.
- *What to do when things go wrong:* When service delivery fails, clear instructions need to be given on how the expected service can be obtained, for example, through the provision of a call centre number or a location guide to ATMs in a particular area.

Financial institutions have developed a number of innovations to assist their customers to access services. These include:

- *Customer training:* Standard Chartered Bank was one of the first banks in Uganda to introduce ATMs. To educate customers, it employed customer service advisers to physically demonstrate the use of ATMs to sceptical customers. It took time even for a literate market to learn to trust a mechanical service.
- *ATM innovations:* Prodem in Bolivia developed its own range of Smart Card ATMs, combined with digital fingerprint recognition technology, as well as stand-alone, voice driven smart ATMs in local languages with colour coded touch screens. (Digital Dividend, 2002)
- *Assisted ATMs:* Standard Bank in South Africa developed a model based around a basic bank account (see above), which would be operated totally electronically called E-Plan. A simplified menu structure was placed on dedicated ATMs that were easier for clients to follow. Staff were recruited who were dedicated to the E-Plan outlets. Because these staff had a narrower job specification and did not have to learn extensive back office procedures emphasis was placed on recruiting staff with “people skills”
- *Customer communication material:* Teba Bank in South Africa carefully designed and tested communications materials based on photographs, with minimal text aimed at explaining the operation of its debit card to semi literate customers.
- *Training merchants:* While merchants are not members of the issuing bank’s staff, if the business case has been carefully constructed, they stand to gain from increasing usage of the card. Providing training and support materials to merchants to better enable them to assist customers should significantly improve the effectiveness of a communications campaign.
- *Call centres:* A phone line connects customers to a call centre where queries on the operation of the account can be resolved, lost cards reported and where payment instructions can be raised. Care is taken to identify frequently asked questions made to the call centre and to provide appropriate and consistent answers for the call centre operators.
- *Training issuers:* The difficulty and opportunity for the host financial institution is that different card issuers have very different motivations for issuing the solution. A Government wishing to pay pensions is mainly concerned with ensuring that users are able to withdraw funds from the card. A petrol company offering a loyalty programme wants to ensure that users understand how the loyalty programme works. The host financial institution may have to devise a communications strategy that informs card users of the wider functionality of the e-banking solution.

Regulatory and Policy Environment

An extensive examination of regulatory and policy issues is beyond the scope of this paper. However, careful consideration of the local regulatory and policy environment is necessary when conceptualising an e-banking project. On a macro level Claessens, Glaessner and Kligebl (2001) suggest that:

“Four areas of the regulatory framework are particularly important for e-finance: the framework for providing telecommunication services; the framework for security and related public and private key

infrastructure; the standards for information and privacy; and the framework for contract enforcement and credit risk analysis.”

Paraphrasing Claessens et al.

- High levels of connectivity i.e. telephone and computer infrastructure, facilitate electronic banking. Appropriate telecommunications regulation should enhance connectivity.
- Security and related public key infrastructure relates to having appropriate penalties, certification of public and private keys (part of the security infrastructure) and setting minimum security certification standards.
- Information and privacy relates to notice, choice, access and security. “Individuals must be given notice of which information is being collected and how it is being used. They must be given a choice as to whether to allow such collection. Once the information has been collected, the provider of the information must have access to it, and the collector must ensure its security.”
- Financial and market infrastructure - E finance will allow a more functional, rather than institutional approach to financial sector development. This implies that laws governing financial contracts will become more important than the laws governing institutions that operate in the financial sector.

A case study from India shows the importance of appropriate functional regulation.

Regulatory Constraints to Electronic Banking in India

The following regulatory and policy constraints are adapted from a paper by ICICI Bank “Extending Banking to the Poor in India”, (Singhal and Dugal, 2002)

Eligibility of clients: under Reserve Bank of India guidelines, smart / debit cards can only be issued to clients who have maintained their account satisfactorily for six months. This is likely to restrict the ability of the bank to provide specialised services using a card.

Loading of value: The section on cash withdrawals does not permit the withdrawal of cash or deposit through a POS terminal, which means that all facilities for loading value on smart cards must be housed within bank premises. If the banking system is to extend services to the poor it must be able to do so cost effectively.

Presence at ATMs: The current guidelines do not allow the presence of any persons other than security guards at ATMs, effectively preventing the bank from providing direct assistance to low income, frequently illiterate customers.

Written record of transactions: A written receipt is required either at the instance of the transaction or in a regular report. This may prove difficult with low value high volume transactions.

Customs duties: While automatic teller machines have a customer duty of 60% their cheaper avatars (Cash Dispensers), which have the potential to reach out to the mass market, have a customs duty of 150%.

Service Area Agreements: The current service area approach restricts competition between banks in rural areas, thus making it more difficult for a bank to strategically roll out networks of ATM machines.

Box 5: Regulatory Constraints in India

When designing an e-banking solution for the mass market, the impact of local payment mechanisms also requires careful thought, particularly in relation to establishing appropriate fees and charges for different types of payments. Ketley and Lipschiltz (2004) note:

“Getting cash is probably the most essential service that lower income people currently demand from their bank... Yet the payments industry [in South Africa] is currently unresolved over five critical issues.

- Distinguishing between Cash Back and Cash Withdrawals on a traditional POS
- Distinguishing between ATM and traditional POS transactions
- Establishing an appropriate merchant incentive model
- Providing appropriate incentives for low income customers to move out of cash
- What model solves the customer affordability constraint (on or offline)

This is important. For the unbanked to become banked on a sustainable basis, they need to be encouraged to use the least-cost to-provider channels: for this to occur, providers must price these channels at an appropriately low level.”

Testing an Electronic Banking Solution

The development of an electronic banking solution is far from easy it will have considerable impacts upon the financial institution. Risks during development and design have to be carefully managed.

- *Potential impacts on the financial institution:* This section explores the changes that electronic banking can bring to a financial institution.
- *Managing development risk:* The development phase carries considerable risk that the solution will not be developed as anticipated or will run over cost.
- *Pilot testing:* Whilst pilot testing may demonstrate the product to the competition, it represents the final opportunity to make changes to the design and/or implementation of the product.
- *Research:* The pilot test phase provides an opportunity to research client acceptance of the product, to refine marketing and communications and to test assumptions in the business case.

Potential Impacts on the Financial Institution

Developing an e-banking solution will have significant impact on the financial institution. The following examples are taken from actual experience.

Staffing: A rapid increase in staff to support the introduction of the card. This increase in marketing staff, in call centre staff, in technical support staff needs to be well planned in advance.

Treasury: There is a rapid increase in the volume of short-term transactional balances. This presents an opportunity for the financial institution to make additional income from treasury investments. Additional demands on cash flow management may require the strengthening of the treasury function.

Call centre: The creation and staffing of a call centre, to deal with customer and merchant queries and lost cards.

Marketing support: The level of involvement from the marketing department rapidly increases as the product moves towards rollout. A marketing and communication campaign needs to be designed, an increasing array of customer related questions needs to be answered, branding issues resolved and publicity and communication designed.

Partnership support: The creation of a new function or department to build and maintain relationships with new and existing card issuers. In a multi-partner model, as new issuers are brought on board over time, the nature of partnership support becomes well defined and polished.

New technical competencies: The financial institution needs to respond to the risk management principles outlined by the Bank for International Settlements. Additional skills are likely to be required in risk and compliance, computer audit, internal control.

Systems development: In many cases the introduction of e-banking requires strengthening of the back office systems. This can mean upgrading from bespoke or legacy systems to modern, comprehensive banking systems.

Distribution: Depending on the decisions made as part of the distribution strategy, the Bank may find it has to significantly increase staff to implement and support the rollout of the distribution infrastructure.

Licences: Operating the e-banking product may require the financial institution to obtain additional licences in order to operate the product as specified.

Physical presence: Electronic banking does not require the same physical infrastructure as traditional bricks and mortar banking. But it does require some physical presence. Precisely how this is to be achieved needs further investigation. According to one participant in the virtual conference...

“As we are discovering in our debit card pilot, customers demand access to a person from the institution with whom their account is housed even when there is an Agency relationship (between the Bank and their point of access). There is, and most likely always will be, a trust relationship required between a financial institution and their client relying on some face-to-face contact. If anything, this is even more important in a low income rural segment where education is an important part of the service demanded. Trying to force customers to accept an arms-length/electronic relationship with their financial institution is unlikely to succeed, and innovative ways of satisfying their need for face-to-face contact and meeting cost efficiency objectives will need to be sought.”

Chantal Storbeck, Teba Bank during the Virtual Conference on Electronic Banking for the Poor

Managing Design Risk

The Bank for International Settlement based in Basle has produced important risk management principles for Electronic Banking, which should guide both financial institutions and regulators in the development and operation of electronic banking systems. These are outlined below.

Basle Risk Management Principles for Electronic Banking

- A. Board and Management Oversight
 - 1. Effective management oversight of e-banking activities
 - 2. Establishment of a comprehensive security control process
 - 3. Comprehensive due diligence and management oversight process for outsourcing relationships and other third party dependencies
- B. Security Controls
 - 4. Authentication of e-banking customers
 - 5. Non-repudiation and accountability for e-banking transactions
 - 6. Appropriate measures to ensure segregation of duties
 - 7. Proper authorisation controls within e-banking systems, databases and applications
 - 8. Data integrity of e-banking transactions, records and information
 - 9. Establishment of clear audit trails for e-banking transactions
 - 10. Confidentiality of key bank information
- C. Legal and Reputational Risk Management
 - 11. Appropriate disclosures for e-banking services
 - 12. Privacy of customer information
 - 13. Capacity, business continuity and contingency planning to ensure availability of e-banking systems and services.
 - 14. Incident response planning.

Box 4: Basle Risk Management Principles for Electronic Banking

Source: Bank for International Settlements (2003)

Although they create an important reference framework, the Basle guidelines fail to elaborate on the product development risks inherent in developing an electronic banking solution. The following shortlist is created from the experience of *MicroSave* in assisting financial institutions to build successful solutions.

Cost overruns: Given the highly technical nature of electronic banking, and the difficulty of foreseeing technical challenges, electronic banking projects are highly prone to cost overruns.

Overdependence on key staff: Key technical and operational staff become critical to the successful completion, piloting and operation of the electronic banking solution. Systems architects develop a detailed knowledge of the technical and operational dynamics of the system that becomes difficult to replace.

Scope creep: Due to the rapid pace of change in the electronic banking industry, combined with growing understanding within the institution of the potential of electronic banking, changes in product design during the development phase are highly likely. This tendency for the scope of the product to increase over the development phase needs to be very carefully managed to ensure that priorities are delivered on time.

Marketing promises: Electronic banking products provide marketing departments with a perfect opportunity to oversell potential banking solutions. Technical teams, enthusiastic about the potential of product enhancements, promise the delivery of required improvements to the product, but frequently fail to deliver on time. Unless carefully managed, rapidly growing expectations for the product can create a substantial reputational risk for the bank.

Mis-timing product launch: Given the continuing evolution of an electronic banking product, the temptation is likely to be to launch the product as early as possible. However, this may not be wise, if it means that key functions that should be associated with the e-banking product are not available. In this context a key function is one that influences the profitability of a key business case.

Pricing the product incorrectly: It is very easy to price the product incorrectly by maintaining incorrect assumptions about customer transactional behaviour in the financial model.

Competitive risks: To reach large numbers of clients, e-banking initiatives need to be interoperable. However, competing financial institutions are unlikely to welcome extending interoperability to a newcomer, who has not invested substantially in expanding the overall electronic banking infrastructure.

Resource constraints: Successfully developing an e-banking initiative is likely to demand much greater human resources from the financial institution, than initially anticipated. Product development will impact on every part of the institution.

Project management and prioritisation: An electronic banking solution, can become incredibly complicated --placing multiple demands upon the financial institution and other partners working on the solution. Managing priorities, timelines and responsibilities is a full time, professional responsibility. Careful phasing of deliverables and managing inevitable demands to increase functionality are vital.

Focus on client value proposition: Electronic banking products must focus on what customers' want rather than what we can provide.

Pilot Testing

Developing an electronic banking solution is one of the most challenging and potentially costly activities that a bank can undertake. The financial model is built on multiple uncertainties. The development path contains significant risks. To manage for risk and uncertainty *MicroSave* strongly recommends that E-Banking solutions are properly pilot-tested before they are rolled out to a significant scale. Pilot testing should bring the following benefits:

- *Cost control*: While developing a palm pilot based solution is relatively inexpensive, developing a fully -fledged electronic banking solution can be extremely expensive. To date Teba Bank in South Africa has spent more than US\$ 3.5 million developing its solution and this is much cheaper than most.
- *Determine customer behaviour*: Paper based research can only provide indications of customer behaviour and acceptability. While these indications are vital for initial product design and refinement there is no substitute for actual experience.
- *Train issuers*: If the solution envisages issuing cards through third parties (such as microfinance programmes), then pilot tests provide valuable lessons in how to train issuers in issuing cards to customers and in properly explaining and demonstrating product features.
- *Developing training and communication materials*: Developing and testing training materials for use at different points within the network. This could include separate training and communication packages for branch staff, issuers, merchants, and customers.
- *Develop support capacity*: Pilot tests provide an ideal environment to determine the type of support capacity needed, the nature and structure of any call centre, the number, nature and types of queries that are made.
- *Testing partnerships and refining product offering*: Pilot tests provide an opportunity to test and develop partnerships with each co-brand issuer. Even when the pilot test is no longer necessary for the host, a modified pilot may still be required as a learning curve for each co brand issuer.
- *Allowing time for product offering to finalise*: The pilot test allows the financial institution to finalise the product prior to launch. Additional features may be necessary, or additional controls may have to be added. It is easier and less expensive to add these to the original product offering than to add them later.
- *Risk mitigation*: Whilst pilot tests are useful in testing for risks mentioned by the Bank for International Settlements, pilot tests primarily reduce operational risks, and allow the creation of appropriate risk mitigation strategies.
- *Refining the Distribution Strategy*: Pilot tests generate valuable information on customers and merchant behaviour that can be used to refine the existing distribution strategy.

Research

Appropriate market research is essential given the uncertainties and complexities associated with developing a successful electronic banking initiative. In several failed initiatives in the microfinance community insufficient attempts were made to understand customer preferences and to justify variables in the business model. Some common research issues are presented below:

Product design: A whole range of customer-focused questions must be asked at the concept design phase. What financial needs of the end user are being addressed by the e-banking solution? What product features would encourage the customer to use the solution more frequently? What reactions do potential clients have to the probable product features? How does the product compare with similar products being offered by competing institutions?

Number of transactions per month by type of transaction: Many e-banking initiatives are based around a transaction revenue model. However, estimating the number of transactions per month from an average user is difficult and subject to wide variations. Expressed willingness by potential customers to use a particular payment mechanism does not mean that they will use that mechanism in preference to cash.

Potential market size: The first question typically asked of marketing departments is one of the most difficult to answer and that is the potential market size for an e-banking initiative. The potential market

size supports the investment decision. However, market potential rarely equates with the actual market secured, and it is actual penetration into the available market that matters.

Dormancy: Financial institutions try to ensure that there is a low level of dormancy associated with an electronic product. However, without actual data, a data-warehouse and data mining by customer type, this may be difficult to predict.

Customer satisfaction: Ongoing research needs to be carried out during pilot tests to ensure that the product offered is meeting the requirements of the end user and other stakeholders, as it is at this point that the product offering and communication issues can most easily be addressed.

Business case development: Market research is needed to establish the validity of the business cases presented to different partners in the e-banking initiative. Ensuring that each partner is earning a return is essential to long-term success.

Segmentation: Customer behaviour is likely to vary by market segment. For example, the most common transaction for unemployment insurance and pensions payments is the withdrawal of cash, while the most common business to business transaction is likely to be a transfer of value. Understanding the nature of customer behaviour in each segment allows appropriate differential pricing.

Frequently Asked Questions: Responding to Frequently Asked Questions with the most appropriate answer can significantly increase the usability of a solution. The marketing department should produce Frequently Asked Question guides targeted at different stakeholders: call centre staff, issuers, merchants, and customers.

Testing of brand perceptions: The initial uptake of the card is likely to be influenced by the strength of the brand of the financial institution supporting the card, or the co-branded partner. Over time, after rollout, the brand of the e-banking solution will generate customer perceptions on its own account. For example, the Visa brand is so strong, that it does not really matter which bank issues the Visa card.

Potential Costs of Pilot Testing

Competition: Pilot testing a product allows an institution to finalise its e-products, and it allows the competition time to think through and to develop a competitive response. Or so the argument goes. However, in practice the competition is likely to know about the product you are developing if switch mechanisms are being used, as detailed testing of potential transactions will happen during the technical pilot test phase. Secondly, the gestation period for new e-banking solutions is normally so long that the institution will have time to roll out its product before the competition has developed a response.

Technical Testing Verses a Commercial Pilot Test

During the development process, the functionality of the e-banking solution will be tested to ensure that the solution works as required. This is a technical test and is a normal step in the development of any information technology system.

A commercial pilot test goes much further and tests not *feasibility* i.e. are things possible, but *viability* i.e. is the product likely to be commercially viable and if not what should be done to improve the viability of the product.

A technical test will have established precise parameters that are being tested, whether this particular functionality works, whether the switch is operational and is returning the correct values. Testing follows a strict and controlled testing regimen. Testing proceeds in a linear fashion.

Likewise a commercial pilot test is measured against goals, but goals, which are designed to test viability. In an e-banking pilot test these could include:

- Likely profitability through testing key assumptions on
 - Transactions behaviour
 - Merchant behaviour

- Levels of dormancy
- Level of customer satisfaction with the product
- Competence of issuers
- Ability of the Call Centre to handle issues arising

Models for Microfinance Programmes

This paper is focused primarily at institutions that have the capacity to develop a large-scale electronic banking initiative. However, given that microfinance programmes are focused on the low-income market what role remains for microfinance programmes?

Perhaps the first question that microfinance initiatives should ask is: “Should we develop an electronic solution?” ASA in Bangladesh is still using simplified manual systems that have enabled them to grow to serve more than 2 million clients, at a cost to portfolio ratio of only 8%. It is one of the most efficient microfinance programmes in the world.

Establishing the case for electronic banking is not always simple. Failed pilot tests in India and successful initiatives, like Safesave’s PDAs, have demonstrated that cost saving for the institution is not a sufficient reason to invest in electronic banking. The case for an electronic banking solution needs to be developed from a customer perspective. The value proposition needs to be carefully designed after careful client led research.

Unless the MFI opts for a more modest investment in personal digital assistants, the e-banking initiative will need to develop either a) a large number of clients willing to pay an annual fee for the service, or b) will have to generate a large enough volume of transactions to generate positive returns. Does the MFI have a significantly large client base to generate such revenues?

The next decision relates to the strength of the existing back office systems. Many MFIs have weak back office computer systems, which will make moving beyond introducing PDAs very challenging. In such cases the MFI should first consider further strengthening its banking systems before it moves further.

With a good back office system, the MFI needs to consider its options. The following is a non-exhaustive list of possible options.

- Option 1: Personal Digital Assistants
- Option 2: Credit scoring for micro-loans
- Option 3: Microfinance programmes as issuers of their own cards through a wider initiative
- Option 4: Microfinance programmes operating low-end closed loop ATM systems
- Option 5: Groups of Microfinance programmes implementing a focused programme

The first two options, using PDAs and adopting credit scoring, are aimed principally at improving efficiency and effectiveness and are relatively low cost. Credit scoring should enable a greater number of potentially higher performing loans to be processed more quickly.

Option 3 (with MFIs taking part as issuers of their own cards through a wider initiative) is an approach which is currently being taken by a number of MFIs including Opportunity International Bank in Malawi (which is participating in Malswitch) and Beehive in South Africa (which is currently testing Teba Bank’s A-Card). This option has a number of potential advantages:

Controlled development costs: Considerable sunk costs have already been invested by the financial services partner⁸ in developing the solution.

⁸ The financial services partner could be a licensed financial institution or it could be the provider of the switch / back end processing mechanism.

Quicker development time: With good back office systems, and the transaction processing being performed by the financial services partner, there is much faster development time for the microfinance programme than would be possible if it were to develop its own solution.

Banking licences: The initiative takes place with a partner bank, which may be necessary for legal, operational and risk control reasons. The central bank is likely to require the ultimate holder of deposits to be a licensed deposit taking institution. It may also be necessary for a partnering financial institution to have licenses for electronic funds transfer.

Improved features: The MFI and/or its customers should be able to access additional features which the MFI would have lacked resources to develop had it developed the solution internally. This includes the ability to offer Visa Electron or Maestro branded cards, access to ATMs and a much larger distribution network.

Co branding: Co branding with the financial services partner, especially if the partner is well known and respected, is more likely to communicate to customers that the MFIs e-banking initiative is a serious endeavour that it is well supported and therefore trustworthy.

Improved control of risk and recovery: Introducing an electronic banking product brings serious security concerns related to fraud and error. Partnership with a financial service provider allows the MFI to concentrate upon its core mission of serving its customers, while relying on the skills and experience of the financial service provider in controlling for fraud and error.

Option 4 requires MFIs to have a closed loop ATM infrastructure, which could at a future time be linked to other ATM networks through switches. Under this option MFIs would put in a network of ATMs for their own customers. To date this has only been attempted by larger MFIs in Latin America such as Prodem. However, decreasing prices of technology are likely to make it viable for larger MFIs (specifically those with a savings license) to introduce their own ATMs. Unfortunately, people in all countries do not trust ATM deposits, so it is much less likely that a loan focused programme will be able to recoup ATM costs using ATM deposit facilities.

Option 5 is the potential for groups of MFIs to share the costs of developing a solution. Hewlett Packard is currently testing this approach in Uganda. It is too soon to determine any generic lessons from this experience. It remains to be seen whether the focus on obtaining operational efficiencies in two out of three of the microfinance institutions will be strong enough to drive this option forward.

An Alternative Evolutionary Approach

Mark Steale of Safesave provided a possible evolutionary approach to developing e-banking services during the Virtual Conference on Electronic Banking for the Poor”.

“The first step would be for an MFI that uses a handheld device (or one like a Post Bank that takes walk-ins) to substitute debit cards for the client passbook. Convincing clients to accept the debit card technology should be easy if the MFI offers convenient access to the savings, and the client gets a chance to 'test' the system a couple of times before taking a lot of risk. If the cards offer security features, such as the client's picture, a personal identification number, and a chance to verify balances (that could occur through the handheld device), it should be an easy sell.

However at this early stage the debit cards are still just a 'passbook': the client uses them to deposit and withdraw money from the MFI itself. This idea is important : In a context where ATM and POS access points are limited, clients' savings will be relatively illiquid if the MFI fails to offer a high quality, plain vanilla deposit/withdrawal service in which the whole system is anchored.

Once sufficient clients are drawn into the system, the MFI would take the second step of looking for ways to partner with bigger players to use established infrastructure. I can imagine an MFI gaining access to established ATM networks, and perhaps acting as an agent for the proliferation

of POS devices. Clients would not view transaction costs associated with these new e-banking options as a negative, as long as they were optional additions to convenient cash withdrawals from the MFI, rather than a substitute for them.

Following this conservative approach would keep the MFI on solid ground with its clients, whether or not the debit cards ever resulted in significant access to e-banking solutions. In other words, the MFI does not bet the farm on e-banking; it simply invests early in the technology of debit cards to be able to tap into convenient e-banking options as they move downmarket. In the meantime the MFI enjoys a convenient and secure means to disburse loans to its clients, and an opportunity to familiarize itself with new technology through the internal use of the cards. In the long run, there is good potential for clients to be able to travel about with a card, rather than a lot of cash in their pockets - a major reason to be banked.”

Mini Case Study: Ferlo MEPS

Ferlo MEPS is a partnership between Byte Tech and Ferlo in Senegal aimed at providing an electronic payments system to a network of MFIs. The system is being tested from March 2004 for eight months. The test will include, four MFIs, ACEP, CMS, PAMECAS, PAM-AGETIP, 1,000 card holders, 20 POS devices, 2 ATMs and four reloading points.

The Ferlo MEPS system is expected to provide easier liquidity management, enhance institutional image, and reduce the risk of theft and to federate branches and merchants. It will allow MFI clients to make deposits and withdrawals at any branch, and will allow the MFI to centralize credit decisions.

External partners include

- @fricajuris Consulting, who is ensuring appropriate security and legal compliance,
- Mazars, who is ensuring reliability and transparency of information and who will develop a business plan for the next phase of the project
- Remix – who will carry out research and evaluate impact.

The basic business model is designed around revenue sharing, with 80% going to Ferlo who will maintain and expand the infrastructure, and 20% going to the partner MFI.

Services	POS Terminal	ATM	Cybercafe
Payment	✓	✓	✓
Recharging e-purse	✓	✓	✓
Recharging account	✓	✓	✓
Cash withdrawals	✗	✓	✗
Cash deposits	✓	✓	✓
Non financial services	✓	✓	✓
Health insurance	✓	✗	✗
Sale of prepaid airtime	✓	✓	✓

The MFI will pay subscription fees of approximately \$2,270 and annual maintenance and management of \$1,360. MFI clients will need to purchase the Smart Card for approximately US\$ 9.

Ferlo fees and charges

	US\$
Payment by merchant	0.60
Remote recharge of e-purse	0.40
Remote recharge of client account	0.40
Cash withdrawals	0.40
Cash deposit	0.40
Medical insurance	1.00
Sales of prepaid airtime	0.70

Monitoring: Of client utilization, and by number and types of transactions. Customer satisfaction will be measured along with customer waiting time.

Based on a presentation by Ferlo MEPS to the Africap Seminar (Nairobi 2004)

The Case for Donor Subsidy

During the Virtual Conference David Porteous of the FinMark Trust asked the question “Does e-banking (if we understand it to mean new channels) not offer the prospect of substantial, if not massive, progress in banking the poor, provided certain thresholds are met?”. What are the general conditions that would need to be met?

“One common characteristic which I believe needs careful thought is that both cell phones and bank accounts are subject to strong network externalities i.e. the more users plugged in, the greater the value proposition for each user. For banking, this is especially true for small person-to-person payments which we find are so pervasive in South Africa (let alone widespread government-to-person payments in the form of small regular grants). To benefit from these network externalities, you need a sudden massive increase in subscribers; small pilots often fail because the real value proposition to users is not demonstrated when the network is small. Is this not underlying what we are seeing with the slow progress of some of the micro-finance e-banking experiments?

Hence, a derived question is then whether there is a case for governments or donors to back a massive push in this area (e.g. on e-banking literacy, or subsidizing origination of new accounts) e.g. covering initial fixed costs to get lower marginal costs of wider roll out.

A final comment: the effects of such a push could be very disruptive on existing banking systems – this is perhaps why incumbents and regulators are not often keen. But are we condemned to slow, incremental processes of growth; or is there still a real leap-forward opportunity in new technology for banking?”

David Porteous during the Virtual Conference on Electronic Banking for the Poor

Thinking through the case for donor subsidy, it is possible to derive general principles.

- *Principle 1:* Donor subsidies should focus on building shared infrastructure and consider scalability
- *Principle 2:* The recipient institution should cover the recurrent costs of the e-banking initiative
- *Principle 3:* A careful cost-benefit analysis should be conducted before an e-banking initiative is launched
- *Principle 4:* There is a considerable amount that can and should be learned from the successes and failures of existing and previous initiatives. Donors should document this experience.
- *Principle 5:* There is a potential role for donors to help governments understand and develop appropriate policy environments in which electronic banking initiatives would flourish.
- *Principle 6:* Donors can invest in promoting e-literacy

Discussing each of these points in turn

Principle 1: Donors subsidies should focus on building shared infrastructure and consider scalability

Despite achieving some success, several e-banking pilot tests have not been scaled up or continued. “The key lesson from these pilots is that they did a great many things (on a subsidised basis) which could not

be subsidised on a large scale”. In other cases donors have invested substantial funds in designing a proprietary solution, which cannot be replicated beyond the institution that has obtained the solution.

Principle 2: The recipient should cover the recurrent costs of the e-banking initiative

The e-banking initiative should be sufficiently profitable to cover recurrent costs of the e-banking initiative. Profitability should build to such a level that the institution covers the full cost of depreciating the e-banking infrastructure or its portion thereof. In practice this means for many e-banking initiatives that low cost will need to be built in from the design phase... low cost at all levels of the infrastructure. The transaction has to be extremely efficient and highly automated.

Principle 3: A careful cost-benefit analysis should be conducted before an e-banking initiative is launched

This essential step ensures that the solution being proposed has been properly conceived and designed, considering infrastructure, scalability, customer value proposition, likely costs and revenues. If a donor were investing in developing a major sole or parallel infrastructure, the potential impact on the wider banking system would have to be considered. The cost benefit analysis should include (a) traditional cost/benefit (b) potential for increase in systemic risks (c) potential impact on access to financial services

Principle 4: Documenting successes and failures

Compared to the hundreds of millions of dollars that have been invested in electronic banking initiatives to date, preparations for the virtual conference revealed a surprising lack of hard documentary evidence of either success or failure. Yet it is essential to fully document cases of success and failure to ensure that new initiatives benefit from a growing body of knowledge and build ever-greater chances for success.

Principle 5: Policy and Regulatory environments

The case of India documented in ICICIs study “Extending Banking Services to the Poor” most clearly demonstrates the importance of having an appropriate regulatory and policy environment. In another example, the case of Malaysia, government policy requiring retailers above a certain size to install point of sale devices had a significant influence on card uptake. However, ultimately, David Porteous’ contention that “the effects of (a big) push could be very disruptive on existing banking systems”, may be *the* bigger issue which requires careful thought.

Principle 6: Promoting e-banking literacy

The supposition is that the un-banked will need to be encouraged to see the new system as a safe and convenient mechanism. Due to higher levels of illiteracy among the un-banked, innovative mechanisms for disseminating information will have to be developed and propagated. Interestingly enough there is a precedent for public investment in promoting e-banking literacy. As part of a campaign to encourage federal benefit recipients to use electronic funds transfer payments into low cost bank accounts

“the [US] Treasury has begun a national grassroots education campaign to explain the benefits of direct deposit to federal benefit recipients who do not have bank accounts.” Michael Stegman (1999)

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