



## USAID Financial Services Implementation Grant Program Learning Network



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## CASE STUDY

# Overcoming Back-end Barriers: Opportunity International and Bank Switching Solutions

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## Abstract

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This Progress Note describes Opportunity International's efforts to use technology, specifically back-end switching systems, to enable its banks to achieve widespread outreach to rural microfinance clients. The Note introduces the reader to the concept of financial switching systems, identifies some of the key issues and concerns for MFIs related to implementing switches, and documents how Opportunity International is developing a switching system for its African banks, starting in Malawi.

## About Opportunity International

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Opportunity International ([www.opportunity.org](http://www.opportunity.org)) is a global network of regulated microfinance institutions and nongovernmental organizations (NGOs). It was founded in 1971 and now operates in 27 countries on four continents, serving over 1.6 million clients worldwide. Opportunity is a global leader in building and operating regulated microfinance banks in the developing world. It has nearly US\$600 million in assets serving poor families with microloans, savings, insurance, and training in Africa, Asia, Eastern Europe, and Latin America. Opportunity has financed more than three million micro and small businesses over the last 15 years.

The Opportunity International Bank of Malawi (OIBM) opened its doors as a regulated commercial bank in 2003. By 2008, the bank had nearly 34,000 active loan clients and 195,000 depositors. OIBM has been a pioneer in Malawi in using innovative technologies, such as biometrics and smart cards, to extend outreach and serve poor clients.

## About SEEP

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The SEEP Network ([www.seepnetwork.org](http://www.seepnetwork.org)) is an association of over 70 international nongovernmental organizations (NGOs) that support micro- and small enterprise development programs around the world. SEEP's mission is to connect microenterprise practitioners in a global learning community by bringing them together in a peer learning environment to produce practical, innovative solutions to key challenges in the industry. SEEP then disseminates these solutions through training, publications, professional development, and technical assistance.

## About the IGP Learning Network

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The Implementation Grant Program (IGP) is a competitive grant program coordinated by the Microenterprise Development office of USAID. The program serves as a key mechanism for supporting international and local providers of microfinance and value chain development efforts. The IGP is designed to push the frontier of innovation in microfinance and enterprise development and provide USAID missions and the development community as a whole with case studies of "good practice." Since the first IGP grants were awarded in 1995, many of these practices have been copied, expanded on, and/or integrated by USAID missions and practitioner organizations around the world.

The Financial Services (FS) IGP aims to expand access to microfinance services and increase the financial viability of local institutions. The FS IGP Learning Network, managed by SEEP, brought together the five grantees of the 2006 FS IGP to document and share their experiences in learning products. These learning products are written by and for practitioners in the field of financial services. For other learning products in this series, please visit [www.seepnetwork.org](http://www.seepnetwork.org).

# Introduction

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Less than 10 percent of the people in almost any African country are integrated into the formal financial system. The situation is particularly acute for the rural poor. Both commercial banks and microfinance institutions (MFIs) tend to be centered in more urban locations, with few—if any—rural outlets.

The lack of extensive, reliable distribution systems is arguably the single most important barrier for businesses that seek to serve the base of the pyramid, that is, the largest and poorest segment of the world's people. Achieving scale in rural Africa is particularly difficult. Thinly scattered populations in hard-to-reach areas and poor or nonexistent infrastructure render traditional delivery channels, such as bricks-and-mortar bank branches, expensive and unsustainable.

This Progress Note examines a key component of Opportunity International's (hereafter "Opportunity") strategy to redress this imbalance, especially for the rural poor. The Note introduces the reader to the concept of electronic funds transfer (EFT) switching systems, identifies some of the major issues and concerns for MFIs related to implementing switches, and documents Opportunity's experience with installing a switching system at OIBM.

## Branchless Banking and Switches

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Microfinance providers are increasingly moving towards "branchless banking" solutions in order to serve rural areas sustainably and at scale. These solutions include technology-driven delivery channels such as mobile banks, automated teller machines (ATMs), point-of-sale (POS) devices, and mobile phone banking (m-banking). Even branchless solutions, however, depend on enabling infrastructure and technology, such as electric power, internet and cellular phone connectivity, and banking software. "Back-end" enablers like these are essential for the new branchless solutions to work.

One particularly important back-end enabler is a switching system. This technology drives ATMs and POS devices, linking them with a bank's portfolio management system. It also allows banks to connect to other banks' ATM networks and can support m-banking and international remittances. Many African countries struggle with poorly functioning, costly, or nonexistent national switching systems, which hinders the development of far-reaching, cost-effective rural delivery channels.

Opportunity is actively seeking to develop a switching solution for its microfinance banks in Africa and is now in the process of implementing a switch in Malawi. Once this is complete, Opportunity plans to install switches, where needed, at its other banks in the region. This paper therefore presents a work in progress, outlining the process taken to identify needs, objectives, the proposed technology solutions, and lessons learned from switch implementation at OIBM.

## Box 1. Quick Glossary of Terms

- **EMV.** Refers to a technology standard for debit and credit cards and card-reading devices. “EMV” stands for Europay, MasterCard, and Visa—the three companies that developed the standard. EMV is the card standard used in Europe, with a memory chip embedded in the card. EMV compliance offers global interoperability, as well as high security.<sup>a</sup>
- **Interoperability.** The ability to exchange and use information, usually in a large and heterogeneous network made up of several local area networks.<sup>b</sup> It can also refer to the ability of software and hardware on multiple machines from multiple vendors to communicate with each other.<sup>c</sup>
- **ISO 8583.** The International Organization for Standardization standard for systems that exchange electronic transactions made with payment cards. It defines the message format and communications flow between systems. Most ATM transactions use ISO 8583. Although ISO 8583 defines a common standard, it is typically customized by each network. This necessitates a document acquisition and configuration process to link different ISO 8583 systems together.<sup>d</sup>
- **KYC/AML/CTF** (Know Your Customer/Anti-Money Laundering/Counter-Terrorism Financing). The due diligence requirements that banks and regulated financial institutions must perform to identify clients and monitor financial transactions. The purpose of these requirements is to prevent identity theft fraud, money laundering, and terrorist financing.<sup>e</sup>
- **Magnetic Stripe Card.** The magnetic stripe (“magstripe”) card is typically used for credit and debit cards in the United States. A limited amount of data, such as the card number, is stored on the magnetic band. Information is retrieved by swiping the card through a reader. Signature-based magnetic stripe cards are at higher risk for fraud than EMV cards. That risk is mitigated somewhat by requiring a PIN and using sophisticated encryption algorithms. Magnetic stripe cards can be configured for biometric authentication. However, the card cannot hold this information, so it must instead be stored on the switch database. This requires online access to the switch.<sup>f</sup>
- **Smart Card.** The smart card (also called “Chip and PIN”) contains a chip that can hold substantially more information on the card itself than a magnetic stripe card, including biometric identification and some transaction history. Its benefits include offline capability and high security protection. EMV compliance requires smart card use, but not all smart cards are EMV compliant.

### Notes:

a “Glossary of Terms,” n.d., Safecard.ie (Web site of the Irish Payment Services Organization), <http://www.safecard.ie/home/glossary.html> (accessed May 20, 2009).

b “Interoperability,” n.d., Dictionary.com (source: *WordNet@ 3.0*, Princeton University), <http://dictionary.reference.com/browse/interoperability> (accessed July 23, 2008).

c “Interoperability,” n.d., Dictionary.com (source: Denis Howe, 1993–2007, *The Free On-line Dictionary of Computing*), <http://dictionary.reference.com/browse/interoperability> (accessed July 23, 2008).

d “ISO 8583-1: 2003,” 2003, ISO, [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=31628](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=31628) (copy of the standard for sale; accessed July 23, 2008); and “ISO 8583,” n.d., Wikipedia, [en.wikipedia.org/wiki/ISO\\_8583](http://en.wikipedia.org/wiki/ISO_8583) (accessed July 23, 2008).

e “Know Your Customer,” n.d., Wikipedia, [http://en.wikipedia.org/wiki/Know\\_your\\_customer](http://en.wikipedia.org/wiki/Know_your_customer) (accessed July 24, 2008). For more information on AML/CFT, see “The World Bank and AML/CFT,” n.d., World Bank Web site, <http://www1.worldbank.org/finance/html/amlcft/> (accessed July 24, 2008).

f “Magstripe,” n.d., Reference.com, [www.reference.com/search?q=magstripe](http://www.reference.com/search?q=magstripe) (accessed May 20, 2009); and “Magnetic Strip,” n.d., BusinessDictionary.com, <http://www.businessdictionary.com/definition/magnetic-stripe.html> (accessed May 20, 2009).

## The African Context: Back-end Barriers

Three common back-end barriers for microfinance banks in Africa hinder the mass rollout of lower-cost delivery channels, such as ATMs and POS devices:

1. lack of a core banking or portfolio management system with real-time access for managing transactions outside the banking hall;
2. lack of a switch that drives ATMs and POS devices—in other words, an inability to communicate between those external machines and the core banking system;
3. lack of a network switch that connects a bank to the ATMs and POS terminals of other banks and to other interbank networks.

Opportunity addressed the first issue, the need for a portfolio management system, by installing commercial-grade banking software in all of its banks. The organization is now exploring ways to overcome the remaining two barriers in order to bring financial services more affordably to the poor, especially those in rural areas.

### Why Do Switches Matter?

Developed economies usually have multiple interconnected networks and switching systems (such as MasterCard, VISA, and Cirrus). These networks allow bank customers and cardholders to use almost any ATM anywhere in the world. By contrast, developing countries often have just one network switch, if any. This switch may serve only large commercial banks and exclude smaller banks and MFIs. Some African central banks have sought to address this gap by funding a national network switch, either by themselves or with private sector partners. As a result, the term “national switch” is sometimes used interchangeably with “network switch” in the African context.

Mozambique provides an example of how the lack of a national switch or affordable commercial alternatives can limit outreach. Several of the country’s largest commercial banks run a privately owned switch, but it is not open to smaller banks or MFIs. This means that any other Mozambican bank that wants to install ATMs must build its own stand-alone system. Its customers will be able to use only that one bank’s ATMs, since there is no way to link up with the ATMs of other banks. This situation puts smaller banks and MFIs at a disadvantage, since any single bank will only be able to install and maintain a limited number of ATMs or POS terminals, thus constricting outreach and reducing options and convenience for clients.

Even if there is a national switch, however, challenges can still arise. For example, Malawi boasts Malswitch, a national switch company wholly owned by the central bank. Four Malawian banks were part of the Malswitch network in 2008, with OIBM as its single largest member. Since the program’s inception in 2003, OIBM has issued 115,000 Malswitch smart cards to its low-income savings and loan customers. These biometrically enabled cards are particularly popular among Malawians who are illiterate or lack formal identification.

One drawback of Malswitch, though, is that it uses proprietary technology that cannot “talk” to other domestic and international payments systems. As a consequence, it cannot connect with other networks without adding a software “translator,”



Workers in Malawi display their OIBM SmartCards. (Photo: Opportunity International)

a situation that limits outreach and client services.<sup>1</sup> Membership in Malswitch is also costly for banks and their clients. Banks must pay high fees, including steep charges each time customers use their own bank's ATMs. Malswitch smart cards are expensive as well. They can be sourced through only one designated supplier at \$5–\$7 per card, a high price in a poverty-stricken country. For these reasons, OIBM sought an alternative to Malswitch.

Commercial banks commonly address their switching needs either by forming a consortium with other banks to set up a private network, as in Mozambique, or by adopting a stand-alone strategy that serves only their own ATMs. Thus far, commercial bank consortia in Africa have shown little interest in integrating MFIs into their networks. This may change in the future, as more commercial banks recognize opportunities in the microfinance sector and seek to reach microfinance clients and/or partner with MFIs. However, those MFIs must then also have sufficiently sophisticated portfolio management systems that allow integration with a network switch.

## Box 2. African Back-end Barriers: The Case of Rwanda

Simtel is Rwanda's sole national switch provider, accorded a monopoly contract by the government. Originally a consortium of banks and the government, Simtel nearly went under in 2004 when several member banks were taken over by international investors and another bank collapsed. As a consequence, the Rwandan government assumed majority ownership of the company. In 2008, the German-based African Development Corporation (ADC) purchased a 70 percent share of Simtel. The Rwandan government and World Bank also invested funds to improve the electronic transactions system, and the nationwide switch was scheduled to be functioning by mid-2008.

While fees were not yet determined at the time of this writing, the initial proposed charge of \$15,000 per month for each participating bank would be prohibitive for many, if not most, MFIs. Simtel's instability and high cost have resulted in low availability of branchless options: as of March 2008, there were only 22 ATMs in all of Rwanda. Simtel has announced ambitious plans to add more ATMs and increase ATM cardholders to 1 million by 2010. However, the company's service quality has been criticized by banks and their customers, and its financial viability is uncertain. Until a reliable and affordable switching solution is established, Rwandan banks and clients will be unable to fully harness the power of ATMs.

**Sources:** G. Majyambere, 2008, "Simtel Targets 1m Cardholders by 2010," *The New Times* [Kigali, Rwanda], March 21, 2008, <http://newtimes.co.rw/index.php?issue=13476&article=5041> (accessed April 28, 2008); K. Esiara and J. Gahamanyi, 2008, "Queues in Banking Halls: 100 ATMs to be Installed," *The New Times*, March 15, 2008, <http://newtimes.co.rw/index.php?issue=13470&article=4893> (accessed May 1, 2008); J. Gahamanyi, 2008, "Simtel Targets Five Million Customers by Next Year," *The New Times*, September 9, 2008, <http://www.newtimes.co.rw/index.php?issue=13648&article=9337> (accessed March 12, 2009).

## Switching System: Components and Functions

There are two primary types of switches under consideration: (1) the ATM/POS switch and (2) the network switch. Both switches are often paired together in a single system, but they have unique functions and can be installed separately.

### ATM/POS Switch

An ATM/POS switch, or driver, is needed to communicate between external devices (ATMs or POS terminals) and an institution's core banking system. The switch's function is to verify cardholder identification and relay electronic messages between the external device and the core banking system. In this way, the switch makes it possible to answer account balance inquiries and to authorize and record transactions.

1. Malswitch took steps to change to an interoperable system in 2009, after OIBM's switch project was already underway, but the global financial crisis has delayed implementation of the revamped national switch. See "step 7" for more information.



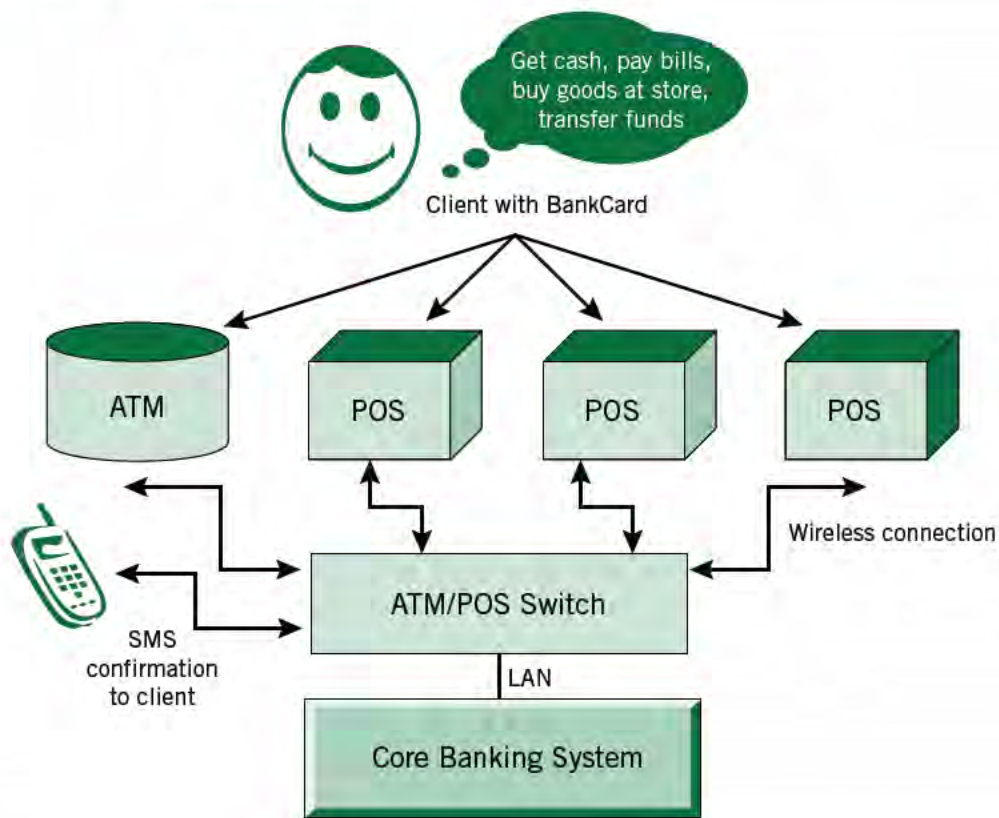
The connection between the external devices and the switch can be either wired or wireless. This latter feature is particularly advantageous, since wireless phone coverage is relatively extensive in most African countries. The ATM/POS switch can be installed on a stand-alone basis to drive only a bank's own devices, although coupling with a network switch is more desirable (see next section).

Opportunity International Bank of Malawi (OIBM) operates 17 ATMs and 20 POS terminals itself. However, because of the national switch, OIBM customers can use 45 ATMs and 1,200 POS terminals across the country.

Similarly, the switch can be connected to the core banking system via a local area network (LAN) or wirelessly. An ATM/POS switch can even send SMS (cell phone

text message) confirmation of transactions, such as deposits received or funds withdrawn. Figure 1 illustrates a potential model for an Opportunity bank in Africa, with the ATM/POS switch configured to interface with Opportunity's core banking system.

Figure 1. Potential ATM/POS Switch Configuration



## Network Switch

A network switch connects various banks together and allows customers from one bank to use another networked bank's ATMs and POS devices. If one bank's cardholder uses an ATM belonging to a different bank on the network, the switch communicates information about account identification, authorization, and transactions between the machine and the portfolio management systems of the two banks.

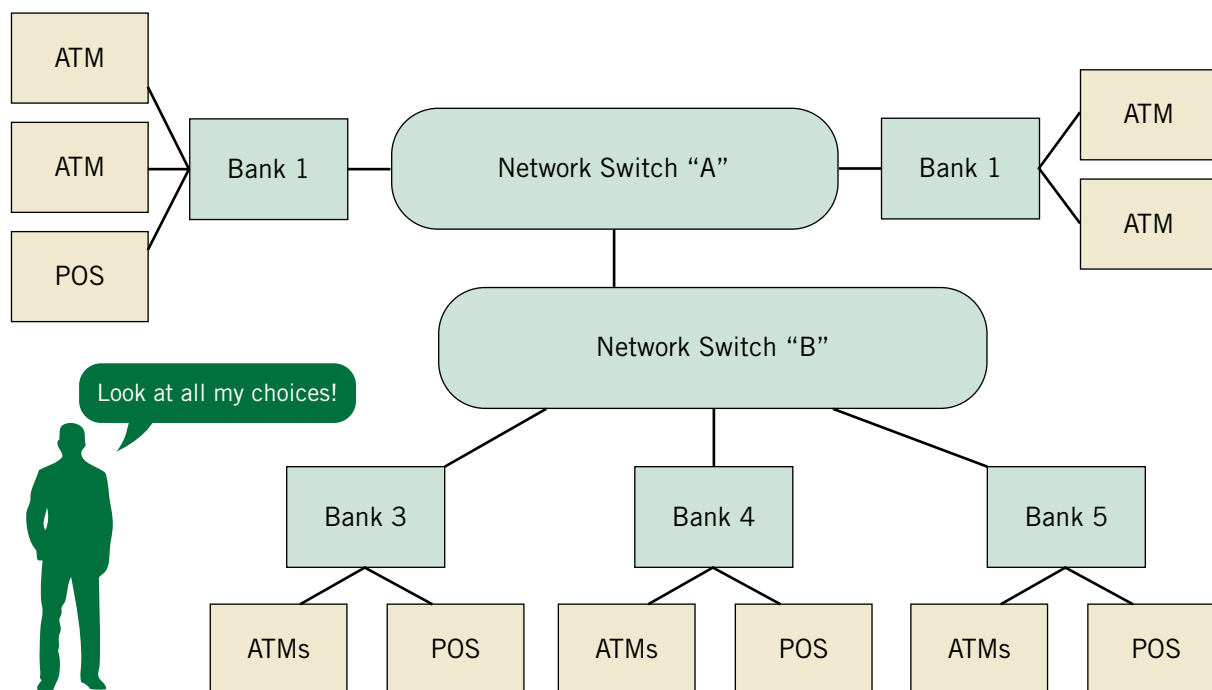
The network switch leverages the banking community's technology investments. It effectively multiplies any one bank's outreach points, which can significantly increase financial access for clients. The outreach benefit can be increased even further by linking one network switch to other networks, thus connecting even more banks. Multiple network

interconnections enable cardholders in developed countries to use ATMs almost anywhere in the world. Opportunity’s goal is to establish similar ubiquity for poor clients throughout Africa.

Customers in Africa pay a transaction fee when they use another banks’ ATMs, just as in developed economies. However, the cost is presumably offset by increased convenience and reduced travel time and expense. In addition, a network bank receives revenue whenever customers from other banks use its ATMs. OIBM has benefited from this additional revenue stream through its participation in Malswitch.

Figure 2 shows the potential multiplier effects of connecting to a network switch, and of that switch in turn connecting to other network switches. The setup allows a customer of Bank 1 not only to use any ATM or POS belonging to Bank 2, but also to access the devices of any bank on Network Switch “B.”

Figure 2. Network Switch “Multiplier” Effect



This graphic illustrates how linking into one or more network switches can exponentially expand outreach. As a real-life example, in 2008 OIBM operated 17 ATMs and 20 POS terminals of its own in Malawi. However, its cardholders could use about 45 ATMs and 1,200 POS terminals nationwide because of OIBM’s participation in Malswitch. In other words, integration into the national switch gave OIBM customers access to more than *double* the number of ATMs and *sixty times* the number of POS outlets than the bank had on its own. This increased access provides a strong incentive for a financial institution to join a network where available, or to help create one if a switch is not yet in place.

## Global Integration and Remittances

An internationally compliant network switch offers the potential of connecting to the global payments system. For MFIs, this is particularly attractive because a global network could process international remittances. However, cost and regulatory issues may make global integration difficult. Opportunity has decided that operating its own ATMs and accessing a network switch for domestic transactions take higher priority in the short- to medium-term. Even if global integration is not immediately feasible, MFIs should still ensure system Interoperability by complying with standards such as ISO 8583. This will make domestic and global integration easier when the opportunity arises.

# Opportunity International's Experience with Switch Implementation

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The rest of this *Progress Note* traces the experience of Opportunity International in implementing a switch for its banking operations in Africa. This case history is presented in chronological steps to illustrate Opportunity's learning process. Key lessons are highlighted for the reader, to help MFIs considering a similar solution.

## Step 1. Determine a Business Strategy: Will a Switch Help?

Technology is only useful if it can support an organization's business strategy. Members of the global Opportunity team, including Africa regional managers, bank CEOs, and technology leaders, met in Manila, the Philippines, in July 2008. At the meeting, they reviewed strategic objectives and examined enabling technologies, with particular focus on switching systems. They specifically came to meet with Nationlink, a switch provider based in the Philippines that focuses on small and rural banks.

The team agreed that their overarching business goal for technology decisions was *to reach as many people as possible at low cost*. To achieve Opportunity's goal of financial inclusion, its banks must offer multiple delivery channels for financial services. These channels must meet business criteria for cost effectiveness while also expanding access for clients. Opportunity had already successfully piloted a number of new channels, including mobile banks in Malawi and Mozambique, and wanted to explore other technologies that could support innovative, low-cost avenues for reaching the poor.

The discussions in Manila identified the capacity for "monetization"—that is, the ability to turn electronic value into cash—as a particularly important feature for Opportunity bank outreach. Most African economies are still primarily cash-based, which means that clients need a wide geographic spread of "mini-points of monetization," as one participant noted. These could be ATMs and POS terminals, operated by Opportunity banks or by authorized agents in outlets such as grocery stores and gas stations.

Team members also felt that Opportunity could gain greater control over vital bank technology by installing its own switch. Having a standardized, Africa-wide switching system could support the business objectives of achieving better cost and technology efficiencies. It could also alleviate some of the challenges experienced in working with existing national switches. Although a national switch fills a technology gap for banks, it often has monopolistic characteristics. Typically, the national switch can set prices without reference to competition and may operate less efficiently in the absence of alternative providers. Opportunity wanted to explore whether running its own switch would be a viable solution.

### Key Lessons:

- Business strategy should drive technology decisions. A switch system supported Opportunity's goal of extensive, lower-cost outreach; priorities and technology solutions for other MFIs may be different.
- Do your homework! It is essential to get a basic understanding of the technology and how it can help your business. The initial research done by Opportunity was invaluable for learning about switch systems and paved the way for eventual implementation.

## Step 2. Identify Technical and Business Requirements

### Essential system features

After determining the business strategy that the technology should support, the team identified essential features that it wanted in a switch system. Some were necessary to continue existing successful efforts; others were needed to address shortcomings that Opportunity had experienced with other systems.

The foremost requirements were:

- **Interoperability**, or multisystem capacity, to connect with other networks and meet global standards;
- **Biometric capability**, that is, accountholder fingerprint identification—already in use in Malawi, Mozambique, and Rwanda, and planned for other Opportunity banks in Africa; and
- **Low-cost cards**, to allow distribution to clients free of charge.

### Security needs

Security was another key need. The team discussed steps to ensure adequate systems security to protect account holders, bank data, and bank operations. The banks must have safeguards for data integrity, and both accountholders and the banks need protection against fraudulent activity. This means that both the switch system and bank management information systems (MIS) must meet appropriate security standards.

Security considerations affect the front-end (the customer interface), as well as the back-end (the office system). One particular concern was the type of client bank card to be used. OIBM was using the Malswitch smart card, with biometric identification embedded in the card itself. This card provided excellent security, but it could be sourced from only one supplier at a high fixed price. Outside consultants questioned whether the risk in Malawi was great enough to warrant the extra cost of the smart card, especially since it is possible to offer biometrics with a cheaper magnetic stripe card. Given this trade-off between security and cost, the Opportunity team placed priority on offering affordable services to the poor, and recommended moving to a magnetic stripe card if possible.



A user demonstrates the biometric feature of the OIBM SmartCard.  
(Photo: Opportunity International)

### Other considerations

In addition, the team discussed other considerations that could affect the decision on the switch. These included:

- **Flexibility.** The new system should be able to adapt to future business or technology developments. An ISO-compatible system was more likely to offer this capability.
- **Regulation.** Bank systems and business processes must meet local legal and regulatory requirements, such as KYC. Opportunity's subsequent experience with central bank actions in several African countries would demonstrate how exogenous regulatory factors can impact the decision-making process and potentially reshape business and technology plans (see step 7).

- **Speed.** Both the time required to install and implement a new system and the time to process transactions on the new system would affect operations and cost.

### Key Lesson:

- When selecting a technology, there will be trade-offs on issues such as cost, security, and convenience. Give priority to features that support essential business goals, while also ensuring compliance with regulatory constraints.

## Step 3. Identify a Technology Partner

The high cost, exclusivity, and/or lack of switching options in Africa led Opportunity to look for alternatives. Given the high level of sophistication, security, and reliability that an EFT switch must have, Opportunity wanted to engage a company with a proven track record. The organization also preferred to work with a company that understood the unique requirements and pro-poor orientation of MFIs. After a considerable search, Opportunity identified the Philippine company, Nationlink, as a potential source for microfinance switching solutions. Nationlink's rural bank focus and technological strength made its switching system a candidate for replication in Africa.

Nationlink's mission is "to bring modern financial services to the unserved and underserved, including the poor and the marginalized, especially in the countryside."<sup>2</sup> Towards that end, the company developed a low-cost ATM/POS driver and network switch for small and rural financial institutions that were previously excluded from commercial networks. Nationlink's network switch complies with Philippine central bank standards and connects to the major commercial banking networks in the country. The system supports a range of financial services that align with Opportunity's customer service goals, including the potential to support mobile phone banking. The system's service options include:

- ✓ cash card loading and reloading
- ✓ cash transfers
- ✓ loan and/or payroll disbursements
- ✓ loan collections
- ✓ cash in and cash out (deposits and withdrawals)
- ✓ airtime reloads
- ✓ bills payments

### Key Lesson:

- Whenever possible, find a technology partner with a proven track record *and* that supports and even shares the MFI's poverty focus. The combination of technology skills and shared mission can pave the way for smoother, more effective implementation.

## Step 4. Assess the Product and Potential Partners

Opportunity representatives met with Nationlink in the Philippines to explore whether the company's product would be able to help Opportunity expand its banking services to rural Africa. Any prospective technology partner needed to be able to offer an immediate, country-specific solution for OIBM, plus support Opportunity's regional technology strategy for Africa. The team held discussions at Nationlink headquarters and observed its live system in operation at a participating local bank.

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2. B. Berida, 2008, "Banking Innovations, Lux Offers," *BusinessWorld* [Manila, Philippines], June 27, 2008.

The Opportunity team probed whether Nationlink could provide the essential system features of interoperability, biometrics, and lower-cost cards. They learned that Nationlink's system offered all three. It is ISO 8583-compliant and EMV-ready, which ensures interoperability. It uses the cheaper magnetic stripe card and has biometric capability. Nationlink also noted that the biometric option could even aid compliance with KYC, since the system quickly searches the database whenever new accounts are opened and denies applications if duplicate fingerprint records are found. This security feature is particularly helpful in rural areas where official identification documents are often limited.

The Opportunity team also inquired about the initial purchase price and ongoing costs of the switch. Team members wanted to assess the potential cost to Opportunity, as well as the strength of Nationlink's management team and business model, which are relevant factors in choosing a long-term technology partner. They also asked about the experience and strength of Nationlink's implementation team, the length of the implementation process, and the steps involved.

The initial discussions closed with a plan for subsequent meetings, to be held one month later in Africa. The purpose of these meetings would be to answer specific technical implementation questions and determine the transferability of Nationlink technology to Opportunity's African banks.

### Key Lessons:

- Make certain that you fully understand both the up-front and ongoing costs to the MFI under the proposed arrangement.
- For major system purchases, assess the business model of potential technology suppliers and the strength of their management team. Both factors affect their long-term viability. You will need them to be available for upgrades and systems support over the years.
- Ensure that the product meets your most important needs, evaluate the quality of the implementation team, understand the timeline, and find out what information and actions will be required during the implementation process.

## Step 5. Ask Questions and Get Answers

This section details the issues raised during the first meeting between Opportunity International and Nationlink. They are presented in a question-and-answer format to help the reader identify questions that they might wish to ask and to describe the options considered, providing a simplified "learning history" of the assumptions and reasoning that shaped Opportunity's decision-making process.<sup>3</sup>

### • What is the advantage of having one's own switch?

Having one's own switch means that an MFI is less reliant on monopolistic, third-party vendors in an uncertain environment. It gains greater control over operations, service quality, suppliers, and cost.

### • What should Opportunity's priorities be for Africa with respect to a switching system?

Opportunity decided that its first priority was to run its own ATMs and POS devices, and make sure that they work reliably to serve Opportunity bank customers. The next priority was to establish interoperability with other in-country banks for greater customer outreach and transaction revenues. The final step would be to connect with global banking systems for remittance capability.

3. For more information on "learning histories" as a knowledge management tool, please see the "Source" list on the Web site of Learning Histories, Vlijmen, The Netherlands, <http://www.learninghistories.net/literature.htm> (accessed September 2009); and Art Kleiner and George Roth, "Introduction to Learning History and Practice," chapter 1 in "Field Manual for a Learning Historian," The Learning History Research Project, Sloan School of Management, Massachusetts Institute of Technology, Cambridge, Massachusetts, <http://ccs.mit.edu/lh/intro.html> (accessed September 2009).

- **Would it be better to start with just an ATM/POS driver, or install both an ATM and network switch at once?**

The team initially considered getting both switches at once for Opportunity's banks in Malawi and Ghana, because the capacity to connect to other banks is important in both markets, and local managers were dissatisfied with the price and performance of their respective national switches. (Later developments in both countries changed Opportunity's plans to install a network switch.) Other countries would need to be reviewed on an individual basis to answer this question, with an evaluation of existing switching options, cost, government regulations, and competition.

- **What would Opportunity's value proposition be to other financial institutions if it installed a network switch?**

Opportunity's network switch could be attractive to other banks in countries without a national switch, offering an affordable payments solution where none currently exists. For banks in countries with a poorly functioning switch, Opportunity could offer higher-quality service and reliability at reasonable cost. Opportunity could also offer solutions, including co-branded cards, to NGO-MFIs that need support in collecting savings and handling loan disbursements and collections.

- **What are the legal and regulatory concerns if Opportunity banks install a switch?**

There are probably no major concerns with installing an ATM/POS driver, since many banks have their own systems and this would be an internal business decision. Installation of a network switch, however, needs to be investigated on a country-by-country basis. Different central banks might have different national switch requirements (subsequent central bank decisions in several countries did, in fact, impact Opportunity's network switching plans, as described in step 7). On the technical side, installation of a network switch requires certification to ensure that security and other standards are met, which should be done by the technology supplier.

- **Should the system be EMV compliant, and should Opportunity banks join major networks such as VISA or MasterCard?**

EMV is not necessary for Opportunity's target market in the near- to medium-term, either for security or global connectivity, although local regulations (e.g., from central banks) may compel its use. It is currently too expensive for Opportunity banks to join the VISA or MasterCard networks. With an ISO 8583 compliant and interoperable system, banks can "port" into EMV networks without directly joining VISA or MasterCard.

- **What are the legal and cost consequences if Opportunity banks are linked to EMV networks?**

In Europe, liability standards dictate that the weakest link is liable in the event of fraud. If Opportunity banks were to connect to EMV networks, lack of EMV compliance could carry greater liability risk. In addition, high settlement fees are incurred if someone with an international VISA card uses an Opportunity bank ATM. Therefore Opportunity decided that its ATMs would initially be set up to accept only locally issued cards and not international cards.

- **Does the Nationlink switch allow a bank to view the real-time account balances of agents?**

Yes, the switch settles agent transactions such as POS-enabled cash withdrawals with a merchant in real time, and the bank can monitor this. An agent typically keeps a minimum deposit in a designated settlement bank. When a customer makes a deposit (i.e., gives money to the agent), the deposit is electronically credited to the customer's account and the amount is withdrawn from the agent's account. Conversely, when the agent pays out a customer withdrawal, the value of that withdrawal is deposited to the agent's account. This monitoring feature can be a helpful tool for managing agent liquidity.

- **What technical steps are needed to install a switch?**

First, an interface must be developed between the core banking system and the new ATM and/or network switch. Second, an interface must be developed and certified with other national or network switches, where applicable. This switch-to-switch interface is normally not difficult since it is based on international standards. Finally, the switch vendor must ensure that the driver works with existing bank ATMs and POS devices. The latter is an internal process and does not require certification.

## **Step 6. Move Forward and Plan for Action**

The general consensus from the Manila meeting was that Opportunity wanted to pursue installing its own switch system and that Nationlink had the potential to meet its needs. The Nationlink technology had the desired interoperability, biometric capacity, and lower-cost features that could benefit both clients and banks. If the system became an Africa-wide solution, it could provide the standardization needed for regional and/or global support and interoperability among all of Opportunity's African banks.

As noted, Opportunity and Nationlink planned to meet one month later in Malawi. In the meantime, they would gather detailed technical information, assess the project's viability, and build a business case. The project plan assumed starting implementation in Malawi and included the following tasks:

1. Document the present technical setup of the OIBM portfolio management system and Malswitch. This included creating accurate, detailed "as-is" documentation of both systems and configuring a prototype for the interface between the new switch and those systems.
2. Lay out the implementation strategy and timeline. This involved outlining the steps for phasing in the new technology, including installation, testing, and final deployment of the ATM/POS devices at all sites, plus ensuring compatibility with existing systems.
3. Develop the business model for the partnership, including pricing.

The time required for the first one to two steps was estimated at three months, with two months needed to complete steps two through three, although some processes could run concurrently. It turned out, however, that the process took much longer than originally expected. As a result, OIBM and Opportunity hired a dedicated project manager with expertise in switching systems to move the project forward.

### **Key Lesson:**

- Switch system selection and implementation require sufficient human, financial, and time resources. Ideally, a dedicated project manager with technical expertise should drive the process. OIBM's progress on the switch transition was delayed because the bank's managers lacked the time and expertise required, especially given the changes and new information that emerged later.

## **Step 7. Respond to New Developments**

The subsequent meeting in Malawi was attended by senior managers and technology experts from Opportunity and its banks in Malawi, Mozambique, and Rwanda. The purpose was to discuss a regional technology strategy for Africa that included bank cards, ATM/POS outlets, and switch implementation. They were joined by a Malswitch representative during one session.

With respect to Malswitch, the group learned that the Malawi Central Bank planned to restructure the company and replace the current switch provider. This effort was part of the central bank's "Interoperability Project," which would convert Malswitch to the ISO 8583 standard. All Malawian banks would then be required to join the national switch. As a result, OIBM decided to install only the ATM/POS driver and forgo its own network switch.



OIBM had earlier identified the cheaper magnetic stripe cards as a key reason for installing its own switch. OIBM determined that the new national switch system could accommodate both magnetic stripe and smart cards. Therefore the bank's managers decided to transition to the cheaper cards, which will enable free distribution to clients.

An unexpected snag emerged when OIBM learned that its client biometric information—held and managed by Malswitch—was stored in a proprietary data format. The bank needed to move this information to its own database, because using magnetic stripe cards would shift biometric data storage from the card itself to the server. In response, OIBM considered purchasing the proprietary biometric system or rescanning the fingerprints of all its cardholders. However, the first option was too expensive and the second would have been costly and cumbersome for the bank and its 115,000-plus cardholders. Instead, the project manager decided to convert the fingerprint data to an open-format system and is currently testing the conversion process.

Subsequent developments in two other African countries also impacted Opportunity's regional switch plans. Both Ghana and Rwanda made it mandatory to join a national switch, but, at least initially, did not deliver a system that banks felt they could afford or rely on.

- In Ghana, the central bank introduced a national switch, called “e-zwich,” and required that all banks join this system and give their customers e-zwich smart cards by December 2008. At the end of 2008, however, bank uptake on e-zwich was slow and the volume of card usage very low. In addition, the central bank official who had been an active proponent for e-zwich was no longer in office, so the system's future was unclear.
- In Rwanda, it seemed likely that banks would similarly be required to join the national switch, Simtel. However, that company's financial viability was in question and its future uncertain. Simtel was also slow in issuing bank cards. Banks were therefore hesitant to invest in significant new technology platforms until these problems were resolved.

In light of these developments, Opportunity is advancing its revised switch plans in Malawi while exploring alternative solutions for customer outreach—such as mobile banks and low-cost satellite branches—for those countries where a switch may not yet be feasible. Opportunity is committed to continuing technology-enabled outreach to the rural poor so that the unserved and underbanked may have access to financial services.

### Key Lessons:

- Stay flexible. Even the best technology plans are subject to external factors that an MFI cannot control. Several of the events mentioned above—the biometric data format and national switch developments in Malawi, Ghana and Rwanda—affected time, cost, and other factors for Opportunity.
- Build extra time and cost contingencies into your budget and planning documents. Monitor progress on a regular basis, communicate new developments with key staff, and make adjustments as needed.
- Consider exogenous risks, such as major regulatory changes, when evaluating significant technology investments. This means that MFIs must be committed to reassessing circumstances and finding alternative solutions that still provide effective ways of achieving their goals.

## Step 8. Make Final Decisions and Implement

After these meetings, the project manager requested bids from several switch suppliers (including Nationlink) to ensure open, competitive vendor selection. At the time of writing, the project manager had just completed analysis of three potential vendors for the ATM/POS switch. The criteria for evaluating suppliers included both financial and nonfinancial considerations. Beyond cost, the following factors were also considered:

- the companies' global experience in the switch domain;
- their implementation experience, specifically in Africa;
- the strength of their management and implementation teams;

- product maturity and the companies' track record with other customers;
- product compliance with international standards and the degree to which product customization would be needed; and
- the companies' local and/or regional presence to provide product support.

The final analysis revealed that, while all vendors offered good technical products, one came out ahead on experience, management, implementation, and support criteria. The evaluation showed Nationlink to be a strong contender, owing to its microfinance experience, but a different vendor ranked higher in the overall ratings. This supplier's total package cost more, but the project manager felt that the company's comparative strengths—including its experience and support presence in Africa—justified the extra expense. The final decision regarding the switch supplier is currently under review by OIBM management and implementation is scheduled to begin in mid-2009, about one year after investigations began in Manila.

### Key Lessons:

- Get bids from several reputable suppliers to ensure an open selection process and fair price. If possible, check with past customers to get feedback on the quality of the vendors' product, implementation process, and customer support.
- Evaluate potential suppliers not only on the basis of cost, but also on other relevant nonfinancial factors, such as company experience, product quality, timely delivery, and the ability to provide product support. These characteristics are all important when installing sophisticated technology and should be factored into the final decision.

## Conclusion

Opportunity's first effort to install its own ATM/POS switch is nearing realization at OIBM. The MFI has overcome many hurdles, including changing technology options, a shifting regulatory landscape, and an initial lack of internal switch-specific expertise. However, the organization's global MIS team and its bank managers in Malawi developed solutions to the problems that arose and learned valuable lessons in the process. The experience that they acquired should lead to smoother technology implementations in the future.

From the start of the switch project, Opportunity set out to document its experience in order to build a knowledge base to share with its banks and other MFIs. The organization's goal is to continuously improve technology strategy, decision making, and implementation so that Opportunity and the wider microfinance community can more effectively reach out to and serve the rural poor.

### Key Lesson:

- Document and share lessons learned so that others do not need to reinvent the wheel. This will expand the microfinance industry's knowledge base, improve execution of future projects, and ultimately enhance services for microfinance clients.



A pleased OIBM customer using an OIBM KwikCash ATM. (Photo: Opportunity International)



