



Opportunity International

GIVING THE POOR A WORKING CHANCE

**Opportunity International Rural Manual:
Extending Financial Services to the Rural Poor**

January 2009

Introduction

This manual is the result of Opportunity International’s three-year project, “Extending Financial Services to the Rural Poor – A Sustainable Banking Model for Africa,” which was supported by the Bill & Melinda Gates Foundation. The goal of this project was to “pioneer a scalable, technology-driven, low-cost approach to providing financial services to poor families living in Malawi and Mozambique, which could then be adapted and replicated throughout rural Africa.”

Opportunity International set out to develop a business model for rural outreach and to document and disseminate this model to other financial services institutions across Africa. Opportunity International’s approach included developing products and services uniquely suited for Africa’s rural population and leveraging technology both to facilitate access by the poor and to support long-term bank sustainability.

The six papers in this manual offer some of the most significant learnings gleaned to date from the project’s implementation. These articles present findings from field experience and research in Malawi, Mozambique and elsewhere in Africa, with contributions from industry experts and implementers. They also point to lessons yet to be learned, as market, technical and regulatory environments continue to evolve. The articles will be updated as new information becomes available, in order to remain as relevant as possible.

The first two chapters of the manual cover product development specifically for the rural sector, including *agricultural finance* and *weather-indexed crop insurance*. Both of these efforts present innovative ways to extend finance into rural areas and enable the poor to build income and protect their assets. The next two chapters focus on using technology to enable widespread outreach and enhance efficiency, namely *mobile phone banking* and *back-end switch systems*. The final two sections present lessons learned from *developing a cost benefit analysis tool* in Malawi and Mozambique in order to assess financial service delivery to rural clients and *banking rollout approaches* to expand microfinance operations to rural settings. In sum, they offer effective, replicable ways of achieving the project’s goal: to provide financial services to the underserved and unserved poor.

This manual is intended to provide a useful introduction to the various topics covered. The papers are not highly technical, although they contain some technical detail. The manual is targeted at microfinance bank managers who wish to familiarize themselves with the basic issues involved in undertaking, say, agricultural finance or mobile phone banking, so that they may move forward on such projects on an informed basis. This manual will be made available to bank management and will be posted on Opportunity International’s new virtual community – Opportunity Exchange – which uses the SharePoint platform to enable document and information-sharing around the world.

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Opportunity International

GIVING THE POOR A WORKING CHANCE

Chapter One

Agricultural Finance:

Meeting Rural Sector Needs through Crop Lending and

Other Products

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1. Introduction

Traditionally, commercial bank lending to the rural population, especially smallholder farmers, has had a bad reputation, with high administrative costs and high rates of default due to crop failure, market failure, side-selling and household pressures. With involvement of governments and donors in rural financing, the perception arose amongst recipients that rural lending was a grant rather than a repayable loan with interest, causing widespread default. However, to move agricultural production from subsistence to commercial levels, even at a small scale, requires an increase in the use of higher-quality inputs, added-value processing and improving access to ever-increasing markets in urban areas and overseas markets. This in turn requires the development of a sustainable and more robust rural lending model.

Throughout Africa and the rest of the world, there has been a trend for the population to move from the rural areas to the urban areas, encouraged by paid employment, access to services, and the lack of land and resources. It is vital to keep the rural areas productive and vibrant in the face of these pressures. Extending microfinance services to the rural community is an important element to supporting and developing the rural poor.

Opportunity International has made a strategic decision to be a market leader in rural finance in Africa, and as such this paper is the beginning of that process. The main purpose is to improve understanding and support the extension of microfinance services to the rural marketplace, with an emphasis on agriculture and agro-processing. This paper presents key issues and recommended Action Points for banks to develop greater knowledge of agricultural markets in order to provide appropriately structured and targeted products.

PART I. UNDERSTANDING AGRICULTURAL COMMODITIES AND MARKET PRICING

2. Africa and the World Markets

Individual African countries have very few commodities that dominate the world market. Shortages and surpluses in Africa rarely drive the world price both with regard to exports from Africa and imports to Africa. There are exceptions to this, such as the dominance of Madagascar in the world vanilla market (where cyclones and civil war in the vanilla growing area can cause a dramatic increase in the world price) and cocoa from Ghana. For the majority of commodities, Africa is a price-taker, both for exports and imports. It is therefore important to understand how the world market affects the domestic market.

African commodities can be broken down into four main categories, each with their own characteristics. These categories are Traditional Exports, Non-traditional Exports, Imports and Domestic commodities. Examples and their trading characteristics are provided in Table 1 below:

Table 1

AFRICAN COMMODITY CATEGORIES		
Category	Examples	Market Characteristics
Traditional Exports	Coffee, Cotton, Tea, Cocoa, Sesame, Vanilla	Follow the world market prices with prices fluctuating on a daily basis. Possibilities to hedge the price risk on certain futures markets.
Non-traditional Exports	Fruit, Vegetable, Flowers & Cuttings, Fish, Dried Fruit, Organic products.	Not usually sold through public world markets. Seasonal contracts direct to end-distributors and users.
Imports	Cooking Oil, Sugar, Rice, Wheat, Processed foods and juices	Non-traditional food crops, usually linked to increased urbanisation and improved income and lifestyle
Domestic	Bananas, Cassava, Potatoes, Cabbages, Onion, Tomatoes, Sorghum, Millet	Very little international trade with exception of neighbouring countries. Bulky, perishable and normally low-value.

3. Import and Export Parity Values

The most important concept to understand with regard to the impact of the world market prices is to identify whether a particular commodity has an *Import Parity Value* (IPV) or an *Export Parity Value* (EPV) within the domestic market. IPV indicates a pricing strategy in which suppliers charge domestic customers what they would pay if they were importing the goods from the world market; that is, suppliers charge the world market price plus transport, tariff and other applicable import costs. In contrast, EPV is used when suppliers set the price for domestic customers at export value, less transport, tariff and other export costs. Table 2 provides examples of each of these pricing policies.

Table 2

Import Parity Value – e.g., Rice		Export Parity Value – e.g., Coffee	
Cost in Country of Origin (India)	\$ 350 / mt	Sale Price in Terminal Market	\$ 2,000 / mt
Sea Freight to Africa **	\$ 90 / mt	Less Sea Freight from Africa **	\$ 100 / mt
Inland Cost to destination **	\$ 120 / mt	Less Inland Freight Cost **	\$ 80 / mt
Import Tax in destination (25%)	\$ 140 / mt	FOB Price in Country of Origin (EPV)	\$ 1820 / mt
Total cost in domestic market (IPV)	\$ 700 / mt		

** The freight cost on the same route can be different for inbound cargo and outbound cargo. Freight companies will charge according to which direction is the least used. This can also apply to Sea Freight costs.

A Traditional Export commodity (and non-Traditional Export commodity) will operate at EPV. Therefore tracking the world market price, minus the logistics costs, will determine the price expectation for exporters and consequently relate to the price expectation for the domestic producer/farmer. This knowledge is essential to the bank's analysis of the earnings potential for a particular crop.

For all the major commodities that are imported to African countries, the significance of IPV is that it is normally much higher than the world market price due to the high logistics costs and local import taxes. Even if a commodity is produced in-country, the typical price trend for the domestic market will follow the IPV. The exception to this is during the harvest period, when the domestic price can drop due to the short-term excess volume in the market. The price can also go much higher than the IPV when there is a lag-time to import stocks to alleviate local shortages.

Commodities operating at IPV price levels are normally good opportunities for smallholder producers, because even with low yields and inefficient production they are compensated by high prices. When calculating the IPV for any commodity it also important to identify the level of import tax, which can vary according to preferential trade areas like SADC, COMESA and the East Africa Community.

Statistics produced annually by the Food and Agriculture Organization of the United Nations (FAO) for each African country highlight the level of domestic production, imports and exports and the level of consumption. This information is available for most of the major food crops and indicates the “food balance” – or statistical picture of a country’s food supply – in any market in a particular year. Countries where the level of production for any particular is below domestic consumption will tend to operate at the IPV level and those where the level of production is above the domestic consumption will operate at the EPV level. It is important to also investigate whether there is regional impact on the IPV and EPV levels (see Section 4 below).

Action Points I

- Gather world market historic price data for domestic crops and identify trends.
- Identify the national and regional market information services and register to receive daily, weekly, monthly and annual price data.
- Establish the food balances for your country based on local consumption, local production, level of imports and quantity of exports.
- Obtain a copy of the national and regional tariff book and identify if any preferences are applicable to target crops.
- Identify the crops that operate at IPV and EPV, including the estimated freight costs and tariff rates applicable for each crop. This information should be available from the local market information service.

4. Regional Impact on Agricultural Markets

Apart from understanding the world market influences on the domestic market, it is also important to recognise the influence of neighbouring markets. Unless operating on an island (Madagascar, Reunion, Mauritius, Seychelles), where transport costs to the nearest neighbours are high, goods and services will normally move to and from neighbouring countries in a relatively free manner. This effect will also be noted even when there are

import and export bans in place. As a typical example, there are very low official export figures for maize and beans moving to Kenya from Uganda and Tanzania, yet every year in the last 20 years between 150,000-200,000 metric tonnes (mt) of maize and beans have moved to Kenya to support its food markets.

Just as there are domestic IPV and EPV values for the crops imported from and exported to the world market, there are also IPV and EPV in the neighbouring markets. These will be particularly important for the basic food crops. Under the current political and social turmoil in Zimbabwe, for example, the surrounding countries are experiencing strong demand and high prices for maize – the staple food. Even when Zambia, Malawi and Mozambique produce surpluses, their prices do not fall significantly to EPV due to the high demand for maize in Zimbabwe. Even if Zimbabwe did not import maize from those three countries, however, the higher regional price for maize would still be maintained. This is because Zimbabwe would then need to import from neighbouring South Africa. The regional impact of Zimbabwean demand would cause the IPV to Zimbabwe from South Africa to become the EPV for Malawi, Mozambique and Zambia. Understanding the relative surpluses, shortages and market interactions within a region can assist with price projections for the domestic market.

Most African countries have a “zero” rate of tax for the basic food crops. However, sometimes tariffs are imposed to protect local producers. Also, individual countries may impose import and export bans, which have the same impact as imposing import or export taxes.

The flow of goods and services between neighbouring countries can be hampered by poor road and rail networks and the availability of surplus freight. Freight companies will charge variable rates for the same distance and route depending on such factors as whether they can get a return load of cargo, the border clearing time is excessive or the road conditions have deteriorated due to flooding and damage. For instance, the TAZARA rail line charges \$ 120 per metric tonne to transport copper from Ndola, Zambia to Dar es Salaam, Tanzania, but may only charge \$ 50-60 per metric tonne for bulk cargo from Dar es Salaam to Ndola, as wagons may travel empty due to low volumes of cargo going in this direction.

Action Points II

- Establish the food balances for your neighbouring countries and identify the traditional direction of regional commodity flows.
- Look at historic data for when prices have been high and low in your markets and identify the trends in your regional markets.
- Identify any tariff and non-tariff barriers that have been imposed by your country and your neighbours
- Use FAO national and regional statistics for information on food balances and commodity flows.

PART II. UNDERSTANDING AGRICULTURAL LENDING & THE RURAL MODEL

5. Crop Finance / Seasonal Lending

The characteristics of lending to the rural community are completely different from urban and consumer lending. Agricultural lending is mainly determined by the seasonal nature of financial demands and production cycles for various rural enterprises, which in turn affects the agricultural producer's cash flow. Planting crops and raising livestock require upfront expenditures, with income received only after a period of time. Table 3 shows how lending periods and repayment terms are linked to typical production cycles.

Table 3

CROP LENDING & REPAYMENT PERIODS		
Crop	Typical Lending Period	Typical Repayment
Maize	6-7 months	Single bullet payment
Beans	5-6 months	Single bullet payment
Poultry layers	22 weeks to first production, then 50 weeks of daily production	Weekly after 22 weeks for 40 weeks (production at end of laying period is lower)
Poultry broilers	7-8 weeks to full production	Single bullet payment
Dairy	27-30 months until first production, then 10 months per year	3-4 year loan with payments during last 18 months
Fish	4-6 months from fingerling to harvest	Bullet payment at harvest
Vegetables	10 to 20 weeks	Weekly payment after 10 weeks
Tobacco	8 months for production and marketing	Bullet payment at harvest
Tea	6-10 months harvest per year	Monthly payment after 1-2 months grace period
Coffee	2-3 months harvest per year	Monthly payment during harvest

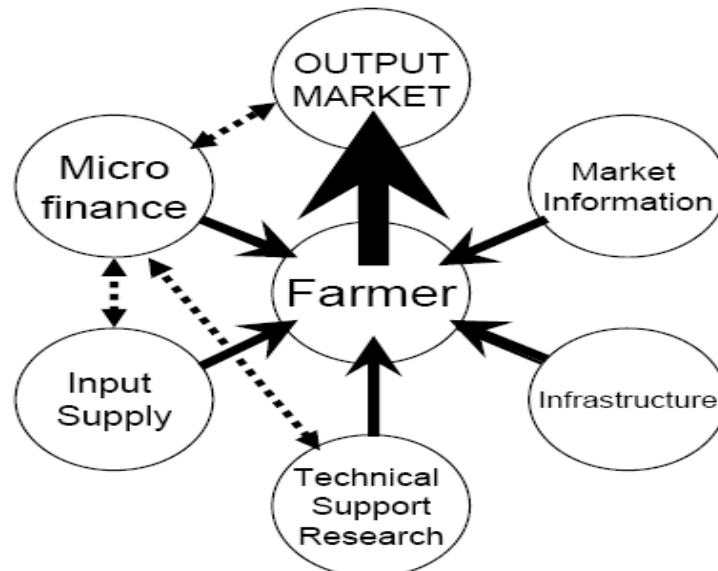
It is important to understand each crop's growing season(s) and duration of earnings opportunities in order to structure loan terms appropriately. For example, dairy cows take over two years to become productive, but then provide a steady income stream for an extended period of time. As shown in Table 3, dairy loans therefore have multiple payments over three to four years, as compared to loans for a crop like maize, which require a single bullet payment at harvest. This means that loans must be tailored by crop to take into account the time of expenditure and the timing and frequency of the client's ability to repay.

6. The Rural Model

The microfinance institution or bank is just one of many stakeholders operating in rural areas. It is important to recognise the other stakeholders that are also supporting the rural household and to build strategic alliances to provide a holistic package of technical support, access to inputs and output markets, thereby reducing the lending risks. Figure 1 below - termed “The Rural Model” - provides an illustration of typical components of rural markets and how they might interact.

Figure 1

The Rural Model



The concept of The Rural Model can be used as a tool to identify the sustainability of any production cycle. In recent years, governments and donors have tried to support smallholder producers through a series of interventions. In the 1980s the vogue was to provide free or “soft” loan inputs, normally targeted at a specific crop. This action created market distortions by eliminating the need for private sector lenders and input dealers, with the result that when such projects ended there were no ongoing services at rural level to support the producers. In every potential lending opportunity, it is important to identify and make contact with the other stakeholders in the Rural Model, identify their strengths and weaknesses and establish formal or informal agreements with them.

Action Points III	
Service or Stakeholder	Action
Market Information Service	Is there a National or Regional market information service?
Infrastructure	Does the target group have ease of access to market for inputs and sale of output? E.g., Roads / Transport / Telecoms / Power?
Technical Services, Extension Service, Seed and Crop Development	Are there dedicated Extension Services providing technical support, group formation, training on crop production, post harvest and storage?
Input Supply / Dealers	Where do the target groups get their inputs? Can the lender pay directly to the input dealers?
Output Market	Where will the crop be sold? Do the producers have a contract with a minimum price? Can the MFI get a guarantee or contract that harvest proceeds are paid directly to the lender, which then pays producers any surplus net of loan obligations?

Over and above the usual government extension services, there are often international donors and NGOs, such as TechnoServe for example, who provide extension services to rural producers. There are also private exporters and processors who support and maintain outgrower schemes to ensure a continuity of supply, quality product and traceability of production for international certification schemes. Outgrower schemes are contractual relationships between smallholder farmers and agribusiness, in which the latter provides inputs, training, supervision and a guaranteed market to ensure that crops meet standards such as those imposed by the European Union. These businesses can be important partners for agricultural lending opportunities.

PART III. INFORMATION REQUIREMENTS & FIRST STEPS

7. Know Your Customer – KYC 1

The microfinance institution will require the standard information for account opening and loan application to comply with bank regulatory KYC requirements. Circumstances may include the need for group formation and a group guarantee. Over and above the standard client information, it is important to build a profile of the rural household to assess the food and financial pressures and the possibility of household retention of food grown or cash received. Some of the factors to consider including the following:

- Size of farm and ownership status
- Range and area of crops being grown to determine ability to cover household food needs
- Household demographics (Numbers / Ages) to estimate household food requirements and other potential costs such as education and medical care
- Current sources of income / employment / remittances

- Asset base
- Contact details including mobile phone
- GPS mapping of location and farm
- Market access and linkages

This extra information can be used to evaluate the lending opportunity and the probable capacity of the household to repay the loan. In Africa, where eighty percent of the population are involved in agricultural production, at least fifty percent of rural producers operate at subsistence level, where the household has little or no possibility of producing a tradable surplus to fund loan repayments. The little surplus the household does produce will be used first to cover general living, medical, and education expenses, as well as the all-too-common household catastrophe. In Malawi, where maize is the staple crop, the average family of five must produce up to 800kg of maize before they will have surplus for sale. As a result, up to eighty percent of the rural population operate below the “commercial” level where they would be able to benefit from and repay production loans. Profiling the household and productive land area is key to understanding the lending opportunity.

Action Points IV

- Adjust client application form to add the extra information for rural household assessment
- Identify the basic food requirements for household support
- Identify typical household costs for education / health / essential commodities

8. Know Your Crop – KYC II

For clients in urban areas with an identifiable weekly or monthly income, microfinance institutions can assess level of borrowing acceptable to the ability to repay. This assessment becomes more complex in agricultural lending. For rural enterprises, it is vital that lenders understand both direct and indirect costs and be able to assess both expected yield and market value.

Prior to any lending, the bank should collect independent standard data on the enterprises to be financed. This should include:

- Seed rate and costs
- Fertiliser, chemical rates and costs
- Other costs for tools and equipment
- Labour requirements and costs (if paid labour)
- Pest and disease threats and mitigation techniques
- Expected yields under varying growing conditions and geographic locations within the country.
- Historic and current market price data

With this raw data, lenders should build Crop Profiles, including cost of production, yield and income expectations for each crop or enterprise. In addition to the financial data, the Crop Profile should include a narrative on the strengths and weaknesses of the crops themselves and the output market, particularly price volatility. These Crop Profiles are not for consumption of the potential clients, but should be used by the bank to compare with the potential clients' own costs and expectations. A sample Crop Profile of maize in Uganda is provided in Table 4.

Table 4
Cost of Production, Yield & Price Expectation
Low Land & High Land – Hybrid Maize Uganda

Cost Item/activity	Hybrid Variety					
	Low lands			High lands		
	Qty	Unit cost UgSh	Financial UgSh/ha	Qty	Unit cost UgSh	Financial UgSh/ha
A: Inputs						
Seeds (kg)	25	3,000	75,000	25	3,000	75,000
Fertilizers (kg)	100	650	65,000	100	650	65,000
Herbicides (lt)	-		-	-		-
Other pesticides	2	5,000	10,000	2	5,000	10,000
Bagging materials (for 2 seasons)	48	250	12,000	50	250	12,500
Implements (consolidated/depreciated)			7,500			7,500
Miscellaneous (including transport)			10,000			10,000
Subt-total for inputs			179,500			180,000
B: Labour						
Land clearance	-		-	-		-
Land preparation/ploughing	65	1,500	97,500	65	1,500	97,500
Application of herbicides/pesticides	2	1,500	3,000	2	1,500	3,000
Planting	10	1,500	15,000	15	1,500	22,500
Application of fertilizers	5	1,500	7,500	5	1,500	7,500
Weeding/field management	60	1,500	90,000	60	1,500	90,000
Harvesting	40	1,500	60,000	40	1,500	60,000
Threshing/shelling	12	1,500	18,000	12	1,500	18,000
Storage	6	1,500	9,000	8	1,500	12,000
Drying/bagging	8	1,500	12,000	8	1,500	12,000
Subt-total for labour	208		312,000	215		322,500
Total cost of production (Shs/ha)			491,500			502,500
Yield- dry maize grain (kg/ha)			4,750			5,000
Unit cost of production (Shs/kg)			103			101
Current farm gate price (Shs/kg)			200			200
Most probable farm gate price (Shs/kg)			175			175
C: Profitability						
Gross value of output {current} (Shs/ha)			950,000			1,000,000
Gross value of output {long term} (Shs/ha)			831,250			875,000
Net income (Shs/ha)			339,750			372,500
Output:input ratio			1.69			1.74

Action Points V

- Collect cost and yield data from government extension services, seed and input suppliers, NGOs and projects operating in the applicable sector.
- Compare theoretical with actual data for past years.
- Build Crop Profiles for target crops and enterprises. Update and refine annually.

9. Getting Started with Agricultural Lending

The process for commencing rural lending can seem daunting. The process can be structured in the following steps:

1. Identify the human resources within the bank who have background knowledge of agriculture and agricultural enterprises. If they are not available in-house, then they should be recruited from government services, NGOs, or consultancy groups who are working directly within the agro-industry.
2. Collect the statistical country and regional data as outlined in the Action Points, identifying the commercial crops that are important for food, export and import substitution.
3. From this list, establish which crops are organised into farmers' groups and associations and which organisations are providing the extension services under the Rural Model. These organisations, including the output market stakeholders, could be potential partners. The partners can also assist in building the Crop Profiles and providing statistical data on the target producers.
4. Compile a table that presents this consolidated data for analysis.

As an example, the rural analysis table for Uganda could look like this:

Table 5

RURAL ANALYSIS - UGANDA				
Enterprise	Crop and Value	Potential	Rural Model Stakeholders	Lending Target
Main Export Crops	Coffee \$ 300m	500,000 smallholder growers	10 main exporters with certification schemes for 20% of smallholders. Producer organisations	Registered coffee producers through export houses
	Fish \$ 80m	6,000 artisanal fishermen	6 main processors	Fishermen through processors and members associations
	Tea \$ 50m	6 main Tea Estates + 2,000 smallholder tea producers	Tea Estates and Smallholder Tea Processors	Tea Estates for payroll staff Smallholder Tea through Processors
	Flowers \$ 40m	15 Exporters with labour forces of 100 – 1000 staff	Exporters with payroll staff	Payroll Savings & Loans

	Cotton \$ 30m	250,000 smallholder producers	15 Ginners. Producer organisations	Cotton Producers through Ginners
Local Food Crops	Maize \$ 100m	700,000mt / 500,000 smallholders	5 Organised processors + 100s of small processors	Target Commercial producers.
	Sugar \$ 150m	3 Estates plus 8,000 outgrowers	Sugar Estates	Payroll for Estate workers and smallholder loans for production
	Beans \$ 90m	300,000mt / 500,000 smallholders	Domestic and Regional market	Target Commercial producers.
	Soya \$ 8m	20,000mt / 30,000 smallholders	Domestic and Regional market	Target Commercial producers.
	Bananas \$ 100m	2m mt / 300,000 smallholders	Domestic market	Target Commercial producers.
	Cassava \$ 60m	1m mt / 300,000 smallholders	Domestic and Regional market	Target Commercial producers.
Imports	Cooking Oil \$100m imports + local	70,000 smallholders Sunflower & Palm Oil producing 30% of domestic demand	2 Oil mills processing locally and importing raw vegetable oil	Smallholders through Oil Millers
	Wheat \$ 100m imports	2,000 smallholders producing less than 2% of domestic demand	5 Wheat mills	Smallholders through wheat millers
	Rice \$ 30m imports	100,000 smallholders producing 65% of domestic demand	3 Formal mills plus 100s small mills	Target Commercial producers.
	Malt for Brewing \$ 30m imports	20,000 smallholders producing 25% demand	2 Breweries	Smallholder producers through breweries
Other	Fruit Juice	1,000 smallholders producing 5% demand	1 Fruit juice processor plus local market	Target producer for planned juice programme
	Dairy	150,000 smallholders producing 105% demand	5 Formal milk processors plus 100s informal processors	Target producer groups for collection centre equipment to improve quality and storage.

PART II. ADDITIONAL OPPORTUNITIES IN THE RURAL SECTOR

10. Insurance Products

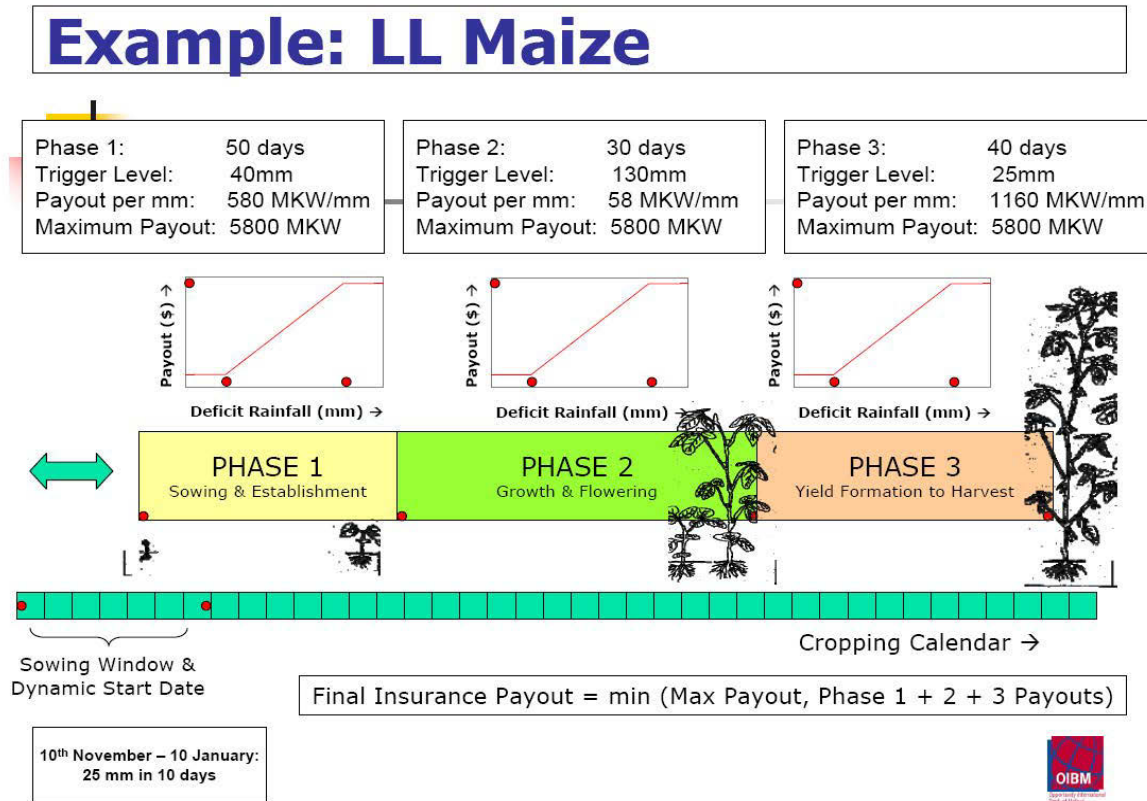
There are a number of insurance products that can provide safety nets to the household and at the same time mitigate the risks involved in lending.

Weather Index Insurance WII. This product is based upon insuring any particular crop against too much or too little rainfall (or any other weather occurrence like cyclone) during the growing season and indexing the subsequent loss against data collected at a weather station. This avoids the necessity to make field assessment of the actual loss of individual smallholders, reducing the administration costs. The insurance company will

automatically refund part/or all of the insured amount when the records from the local weather station identify a particular weather pattern.

Figure 2

Weather Index Model for Maize in Malawi.



To be able to offer WII, the underwriters require up to twenty years weather data and details about each specific crop and the levels of rainfall that will affect yield. Currently only 60% of rural clients in Malawi are offered WII due to a lack of weather stations and data. Typical premiums are 12% for maize and 3% for tea (where rainfall is less critical) of the insured amount.

Other Insurance Products. There are also non-specific insurance products like Credit Life Cover which covers payment of outstanding loan plus interest for death or disability of the borrower, coupled with funeral expense cover for the borrower, spouse and children along with damage to property. These can be provided at an affordable price ranging from 0.5% to 1% of loan value. They can also be coupled with medical insurance for life and inpatient hospitalisation.

11. Payroll Lending and Funds Transfers

The bank has opportunities to provide other financial services beyond crop lending in rural areas, where potential clients receive regular incomes either from paid employment as estate workers or from enterprises that generate regular incomes. Before lending to this sector, however, it is still important to profile the household in order to offer products appropriate to the target market's needs. For instance, in Uganda sugar estate workers have a ten-month production period. The labour is migrant labour from different regions of Uganda and surrounding countries. The labourers' focus is to send home monthly allowances and build savings for activities at home. Developing savings and funds transfer programmes for them may be even more important than lending.

There are several crops and enterprises which lend themselves to payroll lending, including sugar and tea estates, coffee and cocoa plantations, food and feed mills, fruit juice, fruit and vegetable canning, fish and meat processing, and flowers and cuttings farms.

12. Savings and Financial Education

The main focus of this paper has been on identifying lending opportunities; however the nature of rural households, with seasonal cash flows from harvest crops, suggests that savings mechanisms are vital to meeting the ongoing demand on incomes. For those in the urban environment who have a weekly or monthly income, finding funds for school fees and medical needs generally only requires harnessing surplus from the salary. By contrast, in the rural household with typically one main harvest per year, funds must be identified and secured on an annual basis for term fees.

A tea farmer in southern Malawi highlighted this problem: *“I get five months' income from my tea gardens and then a bonus at the end of the season. Normally within two months the funds have gone and I need to survive for another five months before the next harvest, yet household expenses and school fees keep coming.”* This common, poignant need presents an opportunity for banks to offer savings products – along with financial education - to help households better cope with such pressures and economic fluctuations.

13. Holistic Outreach to the Rural Sector

It is important to remember that crop lending is only one of many financial services needed in rural areas. A holistic outreach programme will also include other products such as savings, insurance and funds transfers or remittances to extend financial access to the underserved rural poor. Financial education can help the poor understand the various financial instruments available to them and use them to their benefit. By providing products such as these along with well-structured agricultural lending, the microfinance institution can play a vital role in helping farmers to increase income, build assets and smooth cash flows in order to meet both short- and long-term needs.



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GIVING THE POOR A WORKING CHANCE

Chapter Two

**MicroEnsure's Weather-Indexed Crop Insurance:
Implementation, Product Design, Challenges,
and
Successes – Lessons Learned in the Field**

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1. What Is Weather-Indexed Crop Insurance?

Weather-indexed crop insurance was originally designed to provide compensation to poor smallholder farmers when rainfall during a crop growing cycle was insufficient for them to grow and optimize their yields. However, it has also proved to be a valuable tool for unlocking rural credit and hence improving rural livelihoods. MicroEnsure has partnered with the World Bank and major insurance companies such as Swiss Re to design weather index products in Africa and the Philippines.

Typically, indexed insurance products are non-indemnity and parametric. That is, payouts are not linked to actual losses, but instead are based on an objective measurable variable. In the case of MicroEnsure's weather-indexed insurance, the relevant indicator is rainfall deficiency recorded at local weather stations, rather than specific crop outcomes.

Because it isn't possible to take measurements on each individual farm, rainfall levels are taken at local meteorological stations. Participating farmers within a 20 kilometre radius of a station are assumed to have received the same amount of rainfall and to be affected in a similar manner. In the case of drought, all farmers in the region receive compensation based on a predetermined schedule linked to rainfall and crop requirements.

In order to have meaningful impact on rural economies, indexed insurance products are a necessary first step towards releasing credit for improved inputs and helping farmers build their assets. Indexed insurance provides numerous advantages that make it economically and administratively feasible to offer in low-income environments. The objective measurements reduce fraud opportunities, the mechanism is simple and easy to administer, and payouts are automatic, so there is no need for affected farmers to file a claim or initiate an expensive loss verification procedure. Indexing also reduces the risk of moral hazard.

By enabling poor farmers to manage risk, the product provides a safety net that prevents them from falling back into destitution in the case of severe drought. But it is particularly as an enabler of microcredit that microinsurance helps the rural poor take another step away from poverty and hunger. Small-scale farmers are rarely able to access loans to purchase much-needed improved farm inputs such as drought-resistant seed and fertilizer to increase productivity and raise their living standards. Banks typically view agricultural lending in areas prone to drought as too high risk. And few farmers can provide any form of collateral. But with an insurance arrangement that pays off all or part of the loan in case of severe drought, lenders are increasingly willing to provide credit.

MicroEnsure's crop insurance pilot in 2005/06 enabled farmers in Malawi to receive loans from Opportunity International Bank of Malawi (OIBM) and Malawi Rural Finance Corporation (MRFC). The farmers used these loans to purchase certified groundnut seed and fertilizer. In the event of drought, an insurance payout would go directly to the banks

to pay off the farmers' loans. If no drought occurred, the farmers would benefit from selling higher value production owing to their ability to purchase improved inputs.

So this arrangement - input lending coupled with a weather-indexed insurance policy - allowed farmers in the pilot area to access finance that would have not been available to them otherwise and thereby invest in a higher yield, higher return activity. It also allowed the participating banks to expand their lending portfolio while mitigating their risk. This pilot helped farmers not only manage their risk, but also invest in their farms and build their assets. Owing to the pilot's success, the crop insurance programme has been expanded to cover more groundnut farmers over a greater geographic area and to cover the additional crop of maize as well.

2. The Malawi Experience

Agricultural lending is considered very risky by most financial institutions in Malawi and other sub-Saharan countries. Drought is usually cited as the greatest risk to lenders, as there is a very high correlation between drought and agricultural loan defaults. The weather-indexed insurance developed by the World Bank and MicroEnsure overcame this barrier and was accepted by farmers, lenders and insurers as the best way to manage drought risk. Product design was based on the assumption that farmers in a given area receive the same rainfall as at the regional weather station. Although there are exceptions, cases of severe drought will usually affect all farmers within a 10-20 kilometre radius in a similar manner. The insurance program aims to protect farmers against the potentially devastating effects of these severe droughts.

To understand how the product works, consider the data from one weather station called Chitedze Research Station in Malawi, which was part of the pilot scheme for groundnut farmers in Malawi during the 2005/06 growing season. There are three major growth stages of a groundnut plant, namely (1) establishment and vegetative growth, (2) flowering and pod formation, and (3) pod filling and maturity. Agronomic research data shows that for the soil type around Chitedze a groundnut crop will start to suffer from water stress when the cumulative rainfall within each growth period is below the trigger level indicated in Table 1.

Table 1. Rainfall Index per Growth Period for Malawi Groundnut Crop

Growth period	Days in growth period	Trigger (mm)	Limit (mm)	Payout rate per mm below trigger (MWK)	Sum insured per acre (MWK)
Establishment and vegetative growth	30	60	30	28.5	5,701
Flowering and pod formation	50	160	30	16.9	5,701

Pod filling and maturity	60	100	20	16.9	5,701
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If the rainfall received at the weather station is below the trigger of 60mm for the first growth period, the insurer will pay MWK 28.5 (USD 0.20)¹ per each millimetre below 60. However if rainfall is below 30mm, which is given as the limit, the crop will have suffered from so much water stress that it will not recover, even if there are good rains thereafter. Thus at and below the limit, the total sum insured is payable.

The same approach is used for all three growth phases. At the end of the growing period, the payout from each phase is added to come up with the total payout for the contract. If this amount is more than the loan given to the farmer - in this example, MWK 5701 (USD \$40) per acre - the insurer's payout is capped at the loan amount. The payout is made to the financial institution, which then uses the funds to clear off the loan with any surplus passed on to the farmer.

The sum insured is made up of the cost of the seed and fertilizer, the cost of insurance and the interest payable. The reason for including interest is that in cases of severe drought, farmers will not be able to pay back anything and hence the insurer has to pay off the total sum outstanding. In the case of partial drought, the insurance payout as calculated from the schedule will be paid to the financial institution, with the balance to be paid off by the farmer.

In this pilot, all participating groundnut farmers signed agreements with the National Smallholder Farmers Association (NASFAM) which required them to sell their crop to the Association. NASFAM had memoranda of understanding with the financial institutions whereby at harvest-time it would deduct the amount owed by the farmers before giving them the balance of the proceeds. In areas with no drought, NASFAM deducted the full loan amount to pay the lenders. In order to ensure that the farmers sold their crops to NASFAM, the Association paid a higher price than was available from alternative markets. NASFAM had markets where it then sold the aggregated crop.

Another interesting feature of the insurance scheme is what is called the 'NO' sowing condition, which provides for payout if there is not enough rainfall even to sow the crops. Agronomic studies revealed that farmers usually plant their crop after receiving 25mm of rain within a ten-day period. Farmers in Chitedze told MicroEnsure that they sow groundnut within the period 11 November to 20 January. As a result, the insurance contract start date is dynamic, commencing on the first day of the first dekad to receive 25mm of rainfall.

Every month is divided into three periods called dekads. The first two dekads are ten days long, with the third dekad comprising all remaining days in that month. Sowing is expected to occur between 11 November and 20 January, in the first of the seven dekads to receive total rainfall equal to or above 25mm. If recorded rainfall for each of the dekads is below 25mm, then sowing is assumed to have failed and insurers will pay off the farmer's total loan and interest.

¹ The exchange rate used is USD 1 = MWK (Malawi Kwacha) 142.5

The ‘NO’ sowing condition therefore stipulates that if sowing conditions as measured by minimum rainfall requirements are not met by the end of the sowing period, the insurer will make a payout and the client’s debt will be cleared. It should be noted, however, that there can be times when a farmer will have plentiful rainfall and yet receive a payment and vice versa. This is because payout is based on rainfall received at the weather station, rather than the amount received by any individual farmer. Although rainfall amounts will generally match, there can be localized differences within the given radius of the weather station. Despite the occasional anomalies, however, it is important to remember the product’s broader benefit when there is a catastrophic drought. Below is a summary of the pilot statistics for 2005 / 2006:

Table 2. Pilot Insurance Statistics for 2005/06

Lender	Weather Station insured against	Farmers Insured	Sum insured per farmer / acre (MKW)	Premium per farmer (MKW)
OIBM	Kamuzu International Airport	464	5467.45	382.72
	Chitedze Research Station	116	5701.23	570.12
MRFC	Kasungu	231	5467.45	382.72
	Nkhotakota	83	5393.72	323.62

3. Weather Index Implementation Process

The success of the Malawi project was underpinned by a rigorous nine-step project implementation process that is described below.

Step 1. Opportunity assessment

Although it may seem obvious, the first step is to ascertain if weather-indexed insurance is actually achievable in the country. Unless all the essential elements are in place, it is unlikely that crop insurance will be successful. Opportunity assessment usually requires a site visit to all the stakeholders involved. These include:

- *Meteorological services* in order to determine data availability and infrastructure conditions. It is imperative to determine that sufficient weather stations are in place and working properly. Historical data going back 30 years is the standard requirement for designing weather-indexed products.
- *Insurers* in order to gauge their appetite for carrying the risk and understanding the product/market implications.
- *The insurance regulators* in order to assess their view of the product and legal implications of launching a weather index product.

- *Product distributors.* Finding the right distribution channel for crop insurance is key to its success. There are a number of potential distributors including banks, SACCOs, MFIs, and agri-business organizations. This is the most important link in the distribution chain, and it is essential that the distributor fully understands what risks weather-indexed insurance can and cannot cover.
- *Crop supply chain.* It is also necessary to understand the crop supply chain and to ensure that distributors have sufficient commitment to the project, which must be more than an initial enthusiasm for what is seen as an exciting innovation, as they will be the link to participating farmers.
- *Local agronomists and extension services.* Such organizations, which might be university or government departments, provide agronomic and farming practice information required to build the complex insurance model.

Step 2. Product design

Actual product design starts with collecting detailed climatic and agronomic data and developing prototype contracts. Once all the data has been gathered and verified, contracts with key stakeholders are tested and product approval secured.

Step 3. Product pricing

Following the product design, the next step is to undertake the detailed product pricing process, or if working with a reinsurer, develop term sheets and spreadsheets that allow the reinsurer to price the contracts. Loadings such as commissions and taxes should be taken into account, and there may also be a need to do activity-based costing with the product distributor to find out what the administrative loadings should be.

Step 4. Development of product administration toolkit

A number of tools have to be developed including product workflows, product manuals, and contract monitoring sheets. The latter is a spreadsheets for users to input rainfall amounts received at the weather stations, which then calculates whether a payout has been generated or not. The contract monitoring sheet is developed and agreed with all stakeholders and is password protected to ensure that no-one tampers with formulae.

Step 5. Client education

Client education is an essential part of the implementation process. In many cases, the farmers lack an understanding of insurance, and often a mistrust of insurance has to be overcome. It is normal practice therefore to develop printed materials to be used by field officers to train the farmers about the principles of insurance, premiums and claims processing.

Experience has shown that one of the most effective ways of developing these educational materials is through a workshop with key stakeholders. After the product is explained, the stakeholders are requested to identify the features that they think should be communicated to farmers. Ideally, these workshops should also include some participating farmers, as they can provide a valuable perspective on what their colleagues can understand and value.

Step 6. Farmer recruitment

The first pilot scheme with groundnut farmers in Malawi, starting in the 2005/06 growing season, involved smallholder farmer groups organized by NASFAM, but recruitment may be through a variety of farmers' cooperatives, product marketing organizations, or other social aggregators. Once the distributor is in place, key staff and field officers undertake training of trainer (TOT) sessions so that they can provide the necessary education at client level. They can then hold client training meetings and identify and register interested farmers.

Step 7. Risk transfer

MOUs should be signed with key stakeholders, and especially with the data providers, to ensure appropriate and timely data delivery to all concerned parties. The product distributor then uses the farmer register to develop premium schedules which can be forwarded to the insurer. The policies are issued to the product distributor who acts as policyholder with the farmers. Where applicable, reinsurance arrangements are finalized.

Step 8. Contract monitoring

Contract monitoring sheets and other product tools are distributed to relevant stakeholders who are obliged to enter appropriate data during the contract period.

Step 9. Claim processing

If a claim is generated owing to insufficient rainfall, the contract monitoring sheet will calculate the amount payable. The product distributor then needs to fill out a claim form with amounts per weather station and send it to the insurer. The insurer will then make the payments within an agreed period, usually about 21 days.

4. Product Options

The first pilot schemes in Malawi were based on the standard three-phase model that takes into account crop water requirement during vegetative growth, flowering, and maturity periods. Payouts were made if the aggregate rainfall received during each period fell below the crop water requirement for that phase. This structure was used for groundnuts and maize, but experience in the field and discussion with product distributors and other stakeholders revealed a shortcoming in the model. If there is very little rainfall at the start of a phase but a lot of rainfall during the rest of the period, the

model would mask both the initial deficit and subsequent excess and show a false “normal” reading. So the aggregation over a period introduces some basis risk in that the model will not always reflect adverse rainfall conditions.

The advantage of the original three-phase structure is that it is very easy for farmers to understand. This is a primary consideration where insurance is being introduced for the first time. This product option will continue to be available to those farmers and distributors willing to accept the aggregation basis risk.

As a further improvement in weather index insurance options, MicroEnsure and local stakeholders developed a more sophisticated model to address the aggregation risk in the initial model. The methodology for constructing this new model is described below:

Step 1. Split the crop growth period into one week or two week periods.

Step 2. Aggregate the amount of rainfall received in each block.

Step 3. Compare rainfall amounts received in each block with water requirements per block and note the excesses or deficits per block.

Step 4. Multiply each block excess or deficit by block weighting. This weighting is currently determined subjectively through discussions with farmers and agronomists who have shown that certain periods are more drought or excess rain sensitive than others. For example, those periods when fertilizer is applied are given a higher weighting, as a crop is more likely to suffer negative impact if it experiences insufficient or excess rain at this point.

Step 5. Sum up the weighted deficits.

Step 6. Compare the weighted deficits or excess against the set trigger, and determine the amount over the trigger, if any.

Step 7. Multiply the amount over the trigger with the payout rate per millimetre to determine the total payout amount.

This model is capable of further complex development that takes the weekly moving average and compares this with weekly water requirements. This would be incorporated in step 3 above. The length of the block in this model will vary according to the specific crop. For example, in Malawi, paprika would use 15-day blocks.

5. Prerequisites for Programme Success and Expansion

However well-designed the product, implementation of weather index crop insurance in developing countries requires considerable ongoing management and stakeholder inputs. The Malawi projects have demonstrated clearly how constant monitoring in the field has resulted in the design of a more efficient model than the original three-phase structure. It

should be noted that conditions in different countries, or even different regions of the same country, vary widely and it is unlikely that one model can be directly transferred to another situation without adaptation. This means that each insurance programme requires customisation based on type of crop and local conditions.

MicroEnsure has identified several essential prerequisites for a successful crop insurance programme that will form a strong platform for increasing scale. Some of these are identified below:

- A competent local project manager must be in place to ensure that all the complexities of the programme are effectively handled and stakeholder obligations are met.
- A committed meteorological services authority is absolutely essential to provide timely and reliable data.
- An adequate weather infrastructure must be in place with sufficient operational weather stations not only for pilots but also for future expansion.
- The insurance distributor must be competent as well as committed to the project. There has to be a sophisticated understanding of technicalities of insurance and agronomics, and outside expertise should be brought in to supplement distributor knowledge where appropriate. The Malawi project has generated considerable interest throughout sub-Saharan Africa and beyond, and there is some danger that enthusiasm for weather index crop insurance could lead to experimentation at the expense of properly designed and planned projects. There is a real need to properly research and evaluate any potential project prior to commencement.
- Finally, every crop insurance programme requires well-capitalized risk carriers who have a clear understanding of the market, data provision including the need for proxy data in some cases which decreases the margin for error in pricing calculations, and market assessment of the profit limitations and opportunities in the rural agricultural marketplace.

6. Major Challenges

MicroEnsure has designed and refined weather index products since the initial Malawi groundnut pilot started in 2005. The company plans to launch drought and typhoon insurance in the Philippines and products for Tanzania and Rwanda are due to launch in 2009. The many lessons learned highlight some of the major challenges that are still present in bringing index linked crop insurance to smallholder farmers throughout the developing world. Some of these challenges are outlined below.

- Client education is, and will continue to be, a major challenge for crop or indeed, almost any type of microinsurance in the developing world. MicroEnsure's research in Africa and Asia, conducted through Microfinance Opportunities, has shown both lack of understanding of insurance and often little trust in insurance by potential clients.

The situation will only be addressed by developing appropriate financial education for clients, and providing effective structured training of trainers in product distribution organizations. In Malawi, monthly Transformation Meetings are held with smallholder farmer groups to disseminate financial education and technical agricultural knowledge. One of the lessons learned is the need to hold periodic meetings with clients to assess knowledge uptake and address shortfalls in the curriculum.

- Smallholder farmers are often unwilling to pay premiums for a stand-alone product. MicroEnsure's research has demonstrated time and again that one of the most frequently asked questions by clients is, "Do I get my premiums back if I don't make a claim?" This lack of understanding is frequently found among clients who have already taken out insurance.
- Because weather-indexed products do not measure actual losses, farmers are open to basis risk as experienced loss can fail to match the calculated loss. This risk is mitigated somewhat by the refined insurance model that MicroEnsure has developed.
- There must be a sustainable value chain for the crops in the marketplace. Crop insurance is not a panacea. It can only work within existing supply chain mechanisms and is dependent on sufficiently developed infrastructures. The effects of other agricultural risks such as low selling price also need to be factored into the complex equation.

7. Success Stories

Although there has yet to be a drought leading to a large number of claims, MicroEnsure has seen a significant impact on the livelihoods of poor farmers who have taken out crop insurance. They have been able to access agricultural loans for the first time, enabling them to purchase drought resistant seed and fertilizers. This has produced dramatic increases in yield - often well over 200% - and has enabled farmers to diversify away from the staple maize into cash crops to supplement their incomes.

To date, there is a lack of scientific research into the impact of microinsurance in general and weather-indexed products in particular. In the future, it is hoped that this gap will be filled by qualified industry researchers. As a first step towards assessing impact, MicroEnsure recently conducted a field survey of poor smallholder farmers in Malawi. This series of face-to-face interviews provides anecdotal evidence of the economic and social benefits of crop insurance coupled with agricultural lending. All of those interviewed experienced very significant increases in yields, and they all increased the cultivated area of their farms. All of them introduced at least one cash crop. Several were able to build new houses or barns and buy oxen and carts. They were able to send their children to school and open savings accounts.

Questioned specifically about yield, productive land, and farm improvements, the farmers provided the following results in just two growing seasons:

- 100% increased their crop yield
- 100% increased the amount of land in production
- 100% diversified into cash crops
- 66% bought oxen or ox carts, or both
- 33% built new barns or other farm buildings from increased earnings
- 33% were planning to introduce irrigation in order to increase the growing season

Asked what other socio-economic benefits resulted:

- 33% were able to build new brick houses
- 50% increased the amount of schooling for their children
- 50% opened savings accounts
- 100% received financial and technical education
- 100% expressed confidence in their financial future

The last words about the positive impacts of crop insurance are from Harry Kafakalunda, one of the smallholder farmers surveyed:

“The benefits for me are a better living standard, better food, I have been able to build a better house, and I have bought an ox cart from last year’s earnings. This would not have been possible before.”



Opportunity International

GIVING THE POOR A WORKING CHANCE

Chapter Three

Developing an Effective M-Banking Program:

Key Issues, Principles and Processes

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Developing an Effective M-Banking Program: Key Issues, Principles and Processes

EXECUTIVE SUMMARY

This paper provides an overview of key issues in mobile phone banking (m-banking), with particular focus on the product development process. Generally speaking, banks and microfinance institutions are late entrants into m-banking. They have recently awakened to the mobile phone's potential for extending financial access to poor people, especially those in rural areas who live outside the reach of traditional banking structures. The notion is that wireless mobile phone technology, which has leapfrogged landline telephony in much of the developing world, can similarly be used to leapfrog expensive banking bricks-and-mortar infrastructure.

The first part of this paper provides some general information on m-banking and mobile phone penetration in Africa. It then draws on academic and practitioner sources to present an outline for new product development to guide the design and implementation of m-banking. The focus is on key factors for successful new product or new channel development, with particular application to m-banking. These include the case of how Vodafone developed M-PESA, as well as research and early experience at Opportunity International banks in Malawi (OIBM) and Mozambique (BOM).

While the paper provides information on issues and options specific to m-banking, the emphasis is on the development *process* rather than prescribing a particular m-banking model. This process-focused approach is based on two premises:

- First, m-banking is still in its infancy and the “ideal” bank-led m-banking model has yet to be developed. Given the many unknowns and limited examples, it is wiser to focus on best practices that can lead to the creation of a good model.
- Second, each market has unique opportunities and challenges – including regulatory requirements, technical options, business and competitive environment and consumer needs – which must be factored into any given m-banking scheme. As a consequence, an m-banking model from one country may not be directly transferable to another, whereas a good process can be replicated in every setting.

A quality product development process should shape the value proposition, design and marketing message of poverty-focused m-banking and lead to a higher probability of success in terms of both transformational outreach and financial viability.

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*PART IV. APPLICATION OF SYSTEMATIC NEW PRODUCT DEVELOPMENT TO
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1. Overview

This paper provides an overview of key issues in mobile phone banking (m-banking), with particular focus on the product development process. M-banking that targets the poor and unbanked is a relatively new phenomenon. Although it is debatable how far down-market some of these programs actually go,² m-banking with the potential and aspiration for reaching the poor started in 2004 with Smart-Money and G-Cash in the Philippines, followed in 2005 with WIZZIT in South Africa. Safaricom subsequently launched M-PESA in Kenya in 2007. The rapid uptake of M-PESA in Kenya led to its expansion into neighboring Tanzania the following year.

M-banking schemes such as these have generated considerable attention and excitement. Both for-profit entities such as telecommunications providers and development organizations like CGAP are promoting the mobile channel as an innovative, lower-cost way to deliver financial services to the poor – and potentially make money doing so. Generally speaking, banks and microfinance institutions are late entrants into m-banking. They have recently awakened to the mobile phone's potential for extending financial access to poor people, especially those in rural areas who live outside the reach of traditional banking structures. The notion is that wireless mobile phone technology, which has leapfrogged landline telephony in much of the developing world, can similarly be used to leapfrog expensive banking bricks-and-mortar infrastructure.

The first part of this paper provides some general information on m-banking and mobile phone penetration in Africa. It then draws on academic and practitioner sources to present an outline for new product development to guide the design and implementation of m-banking. The focus is on key factors for successful new product or new channel development, with particular application to m-banking. These include the case of how Vodafone developed M-PESA, as well as research and early experience at Opportunity International banks in Malawi (OIBM) and Mozambique (BOM). The goal is to suggest a process for developing an m-banking offering that meets the needs of underserved and unserved consumers. A quality product development process should shape the value proposition, structure and marketing message of poverty-focused m-banking and lead to a higher probability of success in terms of both outreach and financial viability.

PART I. THE M-BANKING LANDSCAPE

2. What is M-banking?

M-banking uses the mobile phone as a delivery channel for financial information and services. In developing countries, the message format is usually SMS or other text media such as USSD2, although some m-banking programs such as Vodafone's Balance Transfer Service in Egypt use interactive voice response, or IVR. Very few of the handsets in Africa have sophisticated capabilities such as GPRS, so internet-based systems are rarely used. Resource information on the various messaging options and their pros and cons can be found in Appendix I.

² Please see, for example, Ivatury and Pickens (2006) and Porteous (2007).

Typical m-banking offerings allow users to engage in the following activities:

- Check account balances
- Transfer money between accounts
- Send money to other people (P2P)³
- Pay bills (P2B)
- Receive salary or government payments (B2P)
- Buy airtime.

M-banking has evolved into a wider financial platform called *m-commerce* in some developed economies such as Japan and Korea. In addition to banking transactions, people in these countries can use their phones instead of cash or credit cards to pay for transportation fares and goods in shops. They simply place their phone on a touchpad and their bank account is charged for the purchase. Increasingly, virtual money is taking the place of cash and removing some of the costs and risks of handling cash.

Some people envision the growth of a cashless m-commerce system in developing countries as well. Realistically speaking, however, this is a vision far into the future in most settings. It requires the creation of an extensive business ecosystem of participating banks, employers and merchants. It also requires a profound consumer behavioral shift in developing countries from the current almost total reliance on cash to virtual money. Therefore the immediate concern in this paper is first steps in deploying the mobile channel as a way for the poor to gain access to the financial system.

3. Focus on Process

This paper suggests a process for developing an m-banking program. While the paper also provides information on issues and options specific to m-banking, the emphasis is on the development *process* rather than prescribing a particular m-banking model. This approach is based on two premises: First, m-banking is still in its infancy and the “ideal” bank-led m-banking model has yet to be developed. Given the many unknowns and limited examples, it is wiser to focus on best practices that can lead to the creation of a good model. Second, each market has unique opportunities and challenges – including regulatory requirements, technical options, business and competitive environment and consumer needs – which must be factored into any given m-banking scheme. As a consequence, an m-banking model from one country may not be directly transferable to another, whereas a good process can be replicated in every setting.

4. Why M-Banking Now?

There has been a marked upsurge in attention to poverty-focused m-banking recently, as evidenced by the many conferences, publications and blogsites dedicated to the subject. Interest in poverty-focused m-banking is driven by several factors, including the recognition that traditional approaches to banking are cost-prohibitive in reaching the rural poor, the apparent success of prominent programs such as M-PESA, and the desire

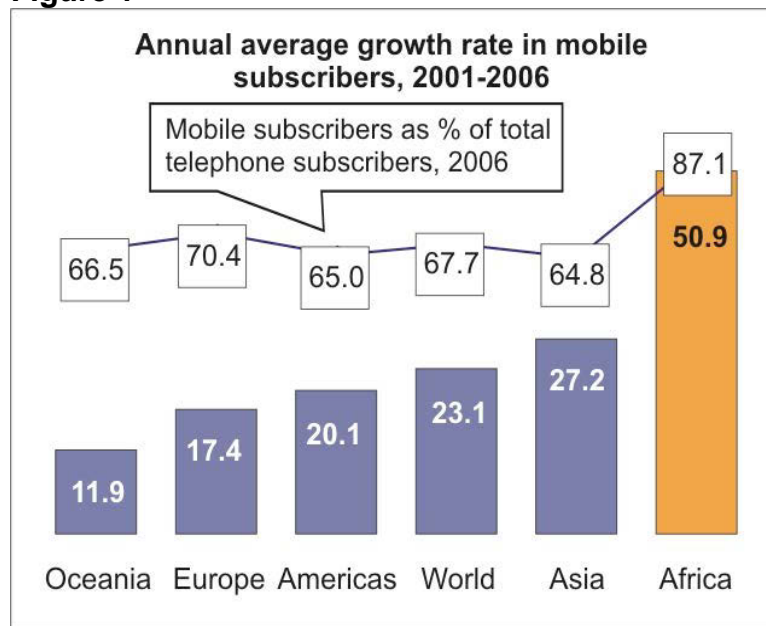
³ Most P2P transfer options are domestic at present. The barrier to using the mobile for international remittances is generally related to regulatory KYC/AML/CTF issues, rather than to technical capacity or business potential.

to tap into the large, growing and lucrative remittances market via the mobile channel. The pivotal enabler to mobile banking, however, is the rapid uptake in mobile phone penetration and coverage in developing countries. As a consequence, the mobile phone has become the first delivery channel to approach national scale, in the absence of alternative or competing infrastructures.

Both mobile penetration and mobile coverage throughout Africa have grown dramatically. *Penetration* indicates the percentage of the population who are subscribers, while *coverage* measures the geographic reach of mobile networks, or the area in which the mobile phone can pick up a signal. While progress still needs to be made especially in rural areas, a number of African countries now have 90% or better coverage nationwide and others have coverage that is over 50% and increasing.⁴

African mobile subscribership grew more than 50 percent per year for the five-year period from 2001-2006, although starting from an admittedly low base. Nonetheless, the growth rate outpaced all other areas of the world, as shown by Figure 1 from the International Telecommunications Union (ITU). The result is that the overwhelming majority - over 87% - of all telephone subscribers in Africa are mobile phone subscribers.

Figure 1



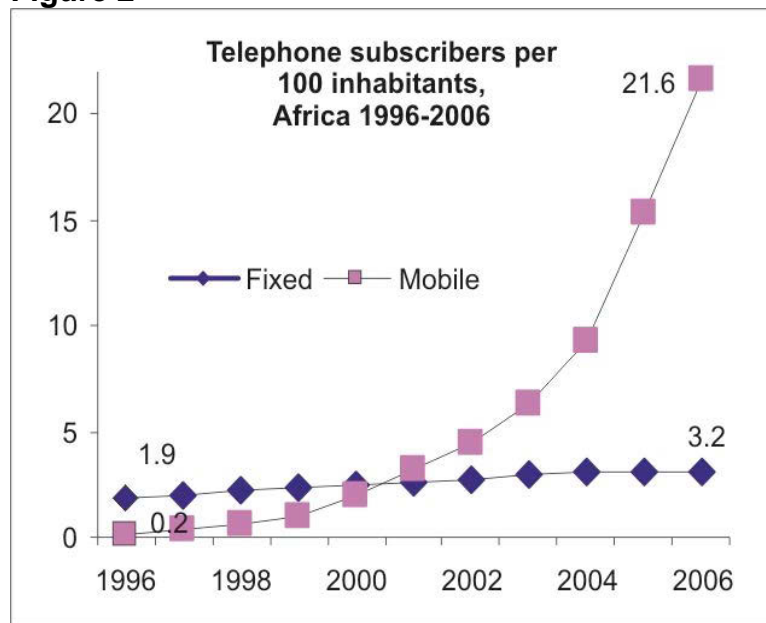
Source: ITU World Telecommunication/ICT Indicators Database, <http://www.itu.int/ITU-D/ict/statistics/ict/index.html>

A consequence of this rapid growth in mobile phone subscribership is an increase in penetration rates from scarcely above zero in 2000 to nearly 22 percent in 2006, with an expectation of continuing – if somewhat flatter – growth in the coming years. Figure 2 compares fixed line to mobile penetration in Africa. The ITU chart shows that mobile

⁴ International Telecommunication Union (ITU, 2007), “Telecommunication/ICT Markets and Trends in Africa,” http://www.itu.int/ITU-D/ict/statistics/material/af_report07.pdf, 8.

telephony is the first ICT to make extensive inroads throughout the region, while fixed connections stayed essentially flat for the decade from 1996 to 2006. (Internet access remains negligible for most of the continent.)⁵ Mobile phones have truly leapfrogged over the old landline technology in Africa.

Figure 2



Source: ITU World Telecommunication/ICT Indicators Database, <http://www.itu.int/ITU-D/ict/statistics/ict/index.html>

PART II. M-BANKING UP CLOSE: KEY ISSUES

5. Market Size

As exciting as these numbers are, it is important to look more closely at what they represent in each market. The overall average masks a wide variance in penetration from country to country. First, sub-Saharan penetration drops to just below 13 percent if South Africa – an atypical market compared to the rest of the region – is excluded. Second, on an individual country basis, penetration ranges from a high of 56 percent in Botswana to a low of just over 1 percent in Ethiopia.⁶

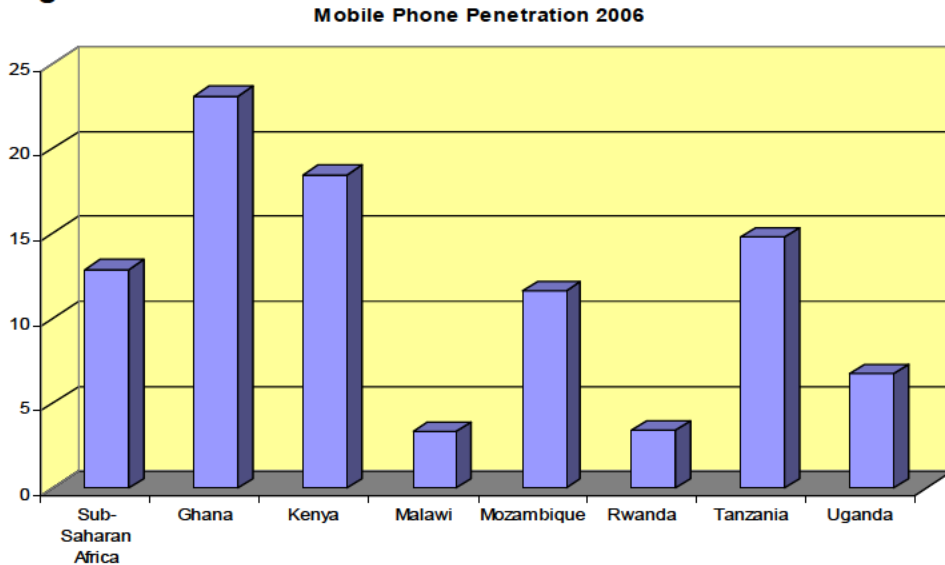
Viewed inversely, this means that the percentage of people who are *not* telephone subscribers ranges from 44 percent in Botswana to 99 percent in Ethiopia. Of course these numbers will change over time. Nevertheless they should provide something of a reality check against the euphoria that m-banking sometimes generates with respect to the numbers of people it can reach in the short- to medium-term. Figure 3 shows 2006 mobile penetration rates in some of the African countries where Opportunity

⁵ See www.internetworldstats.com, which indicates that internet has about 5% penetration for the entire continent. This average masks a wide range of penetration rates, from a low of 0% in Liberia to 27.4% in the small French island of Reunion.

⁶ ITU (2007), “Telecommunication/ICT Markets and Trends in Africa,” http://www.itu.int/ITU-D/ict/statistics/material/af_report07.pdf, 25.

International currently operates, with the sub-Saharan average - minus South Africa - in the first column. As can be seen, there is significant difference in penetration between countries.

Figure 3



Data source: ITU, 2007, http://www.itu.int/ITU-D/ict/statistics/material/af_report07.pdf

6. Market Knowledge

It is also important to have deeper knowledge about mobile phone users beyond penetration statistics, in order to develop as effective an m-banking program as possible. Demographics are one example: studies indicate that the typical mobile phone owner in Africa tends to be urban and male.⁷ Many migrated to the cities from elsewhere and they are more likely to be early adopters. M-PESA creatively capitalized on these market characteristics by focusing on transfers from male, urban migrants to their rural families, as seen in the ad in Figure 4.

Another issue that has potential impact on market targeting, positioning and product features is the difference between mobile phone owners, mobile phone subscribers and those people who are neither owners nor subscribers, but have access to mobile phones. It is difficult to get definitive statistics on the relative size and profile of these different groups, but it is likely that there are many more subscribers than actual phone owners.⁸ Even the lowest-cost handsets are still too expensive for many people. Those who are only subscribers commonly have a SIM card that they swap into someone else's handset when needed. Phone-sharing is common, especially in poorer and rural communities.

⁷ Alison Gillwald and Steve Esselaar (2005), "A comparative analysis of ICT access and usage in 10 African countries," *Towards an African e-Index*, Research ICT Africa, the LINK Centre, Wits University School of Public and Development Management, [http://www.researchictafrica.net/images/upload/Chapter02new\(latest\).pdf](http://www.researchictafrica.net/images/upload/Chapter02new(latest).pdf), 25.

⁸ Jeffrey James and Mila Versteeg (2007), "Mobile phones in Africa: how much do we really know?" *Social Indicators Research* 84 (January 2007), 119.

Market characteristics such as these could affect targeting and a range of product decisions, such as security features and “push” versus “pull” messaging (that is, whether financial information is sent automatically or only at the account holder’s request).

Factors of ownership, geographic distribution within markets and common usage patterns such as phone sharing should be built into any business model for m-banking. Success in m-banking will depend on knowing who the mobile users are, where they live and work, the nature of their access to a phone and what problems they need solved.

Figure 4



Source: Susie Lonie, “A brief introduction to M-PESA,” info.worldbank.org/etools/library/latestversion.asp?240201

7. Customer Focus

While much has been written about m-banking’s potential to extend financial services to the poor, the focus generally has been on technical issues and regulatory requirements, which of course are essential to address. At the same time, however, relatively little has been written from the perspective of customer needs, beyond the fairly broad notion of extending access. Knowledge of the customer and a strong customer focus should be the starting point for all new product development, including m-banking. There is, after all, little value to a technically proficient m-banking program that consumers don’t want or can’t use because it doesn’t effectively solve a problem for them.

“The road to implementing mobile banking is littered with discontinued mobile banking projects, failed new technology vendors, and shelved deployment plans.” (Mas and Kumar, 2008)

“The user experience of the various mobile systems depends on how well specific products correspond to customer needs in different countries. The demand for banking services in developing countries, especially by the ‘unbanked,’ is relatively poorly understood.” (Williams and Torma, 2007)

It is an absolute necessity, rather than a luxury, for m-banking ventures to start with “knowing the customer” as an economic actor; that is, understanding what the customer needs and what customer problems m-banking can solve. Because m-banking harnesses a technological tool in a new way, organizations often focus more on the technology than on the consumer. However, technology is not the primary cause of prior m-banking failures. Rather, most breakdowns happened because the effort was not grounded in knowledge of the customer. As a recent CGAP paper observed, *“Many banks launched into mobile banking without a well-articulated idea of what customers’ problems were and how to address those problems.”*⁹ In other words, the common source of past m-banking failures is not failed technology (although quality technology is of course essential), but inadequate customer orientation and failure to identify and meet consumer needs.

“A lack of market orientation and inadequate market assessment are consistently cited as major reasons for new product failure.” (Cooper, 1990)

8. Market Research

In contrast, savvy consumer-oriented companies like Nokia, which have enjoyed considerable success in developing countries, go to remarkable lengths to understand their markets. They employ people like Jan Chipchase, a “human-behavior researcher” or “user anthropologist,” to spend time with ordinary people in developing countries to get an on-the-ground, in-depth understanding of how people live and what they can profitably use. This approach is sometimes called “camping with the customer” and reflects an effort to understand customer wants and needs from the inside. Sometimes customers can articulate those needs and sometimes the researcher can identify them – and their solutions - by virtue of observation. In both cases consumer-oriented market research is the key that unlocks useful customer knowledge for targeted product development.

⁹ Ignacio Mas and Kabir Kumar (2008), “Banking on Mobiles: Why, How, for Whom?” CGAP Focus Note 48. Washington, D.C.: CGAP, June 2008, 1.

The information that Chipchase gathers helps guide the company's product offerings in developing markets.¹⁰ As a result, Nokia includes phone features uniquely relevant to third-world settings. One example is the LED flashlight on Nokia's entry-level handset, an attractive benefit at minimal cost in an environment that often lacks electric lighting. The phone also includes address books for up to five users, in recognition of the common practice of phone-sharing in poorer communities.¹¹

*“Rather than sending someone like Chipchase to Vietnam or India as an emissary for the company — loaded with products and pitch lines, as a marketer might be — the idea is to reverse it, to have Chipchase, a patently good listener, act as an emissary for people like the barber or the shoe-shop owner’s wife, enlightening the company through written reports and PowerPoint presentations on how they live and what they’re likely to need from a cellphone, allowing that to inform its design...**The premise of the work is simple – get to know your potential customers as well as possible before you make a product for them.**” [emphasis added]
(Corbett, 2008)*

Nokia's extraordinary customer focus and unique understanding of the bottom of the pyramid market has had measurable results: in second quarter 2008, the company held an impressive 53% market share in Africa, 61% market share in the Asia-Pacific region excluding China and 39% in China.¹²

9. The Marketing Concept

The essential point here is not the benefit of hiring anthropologists, but that the creation of relevant (as well as technologically feasible and ultimately profitable) product offerings does not happen automatically. Rather, it is the result of careful observation and responsive customer-centered product development. The business philosophy behind this approach to product development is called the *marketing concept* – which suggests that a company's success is derived from understanding and satisfying customer needs and doing that better than the competition. This is in contrast to how companies all too often actually operate, which is to develop a product and then try to figure out how to sell it to the public.

“The marketing concept holds that the key to achieving its organizational goals consists of the company being more effective than its competitors in creating, delivering, and communicating superior customer value to its chosen target markets.” (Kotler, 2003)

¹⁰ Please see S. Corbett (2008), “Can the cellphone help end global poverty?” *New York Times Magazine*, 13 April, <http://www.nytimes.com/2008/04/13/magazine/13anthropology-t.html>.

¹¹ John Ribeiro (2008), “Nokia introduces handsets, content targeted at rural users,” CIO.com, 4 November, http://www.cio.com/article/459216/Nokia_Introduces_Handsets_Content_Targeted_at_Rural_Users.

¹² “Nokia says has more than half of Africa, APAC markets” (2008), Reuters.com, 24 September, <http://www.reuters.com/article/rbssTechMediaTelecomNews/idUSLO7008520080924>, accessed 20 October 2008.

A common error in business is to fall in love with a product idea and launch it without examining its desirability to the consumer first. This omission more often than not leads to product failure or, at best, suboptimal returns. A danger with m-banking is that financial service providers are liable to rush into this latest “hot” new technology without doing the necessary front-end market-based homework. That is, they are prone to allowing the technology to push the program, rather than using the market’s needs and preferences to shape it.

The importance of a strong, market-oriented focus cannot be overemphasized. Often the conversation is about the potential internal cost-savings to be gained by moving to the mobile platform or about not missing the latest wave of technology. While leveraging new technologies and cost-savings are indeed important parts of the business case, they do not address the top-line, revenue-driving questions such as: Why would customers want to use our m-banking program? Does it offer better value than the alternatives available to them? The bank that has not asked – and answered - these questions prior to development and launch runs the risk of investing in an m-banking venture that the market doesn’t want.

Essential questions:

- Is our m-banking program an effective, affordable solution to identified customer problems?
- Does it offer better value than existing formal or informal alternatives?

PART III. A PATH FORWARD FOR TRANSFORMATIONAL M-BANKING: SYSTEMATIC NEW PRODUCT DEVELOPMENT

10. Transformational M-banking Challenges

Mobile banking, especially mobile banking with “transformational” goals, is a complex and challenging effort. “*Transformational*” m-banking is differentiated from “*additive*” m-banking in that the former targets unbanked people to provide them access to financial services, while the latter simply uses the mobile phone as another channel for serving existing clients.¹³

Assuming that the unbanked rural poor are one of the target segments, an m-banking program will need to address multiple user challenges ranging from illiteracy and innumeracy to financial illiteracy and technological unfamiliarity. The prospective customer may need to adopt several new practices and concepts all at once. These could

¹³ David Porteous (2007), “Just how transformational is m-banking?” http://www.finmark.org.za/Documents/transformational_mbanking.pdf, 6. Please note that additive m-banking is not inherently a negative; in fact, it may be the more financially viable entry point into m-banking. However, the assumption in this paper is that the ultimate goal is to use technologies such as the mobile phone precisely to be transformational and reach populations currently without access to formal financial services.

include first-time use of banking services, first-time use of the phone as a financial delivery channel, and trust that virtual “m-money” will be delivered as intended and can be turned into cash on demand by its rightful owner. The M-PESA pilot experienced all these hurdles, which led to significant changes in its commercial program as a result. A mobile banking effort must also address these issues if it is to draw in transformational customers at scale.

Bank-led models for transformational m-banking are in the very early stages of development. This means that there are many unknowns, which, coupled with the cost of building the technological platform and ancillary m-banking framework, make m-banking a high-risk investment. Such an investment calls for a sound development process built on market understanding. If a transformational (or combination additive and transformational) m-banking program is to be successful and overcome the various adoption hurdles, it is essential to enact the marketing concept. That is, the bank must seek to understand its target market(s) from the very beginning and create a compelling value proposition – and functional offering - that addresses their particular needs and is easy, attractive and affordable for them to use.

11. Principles for the New Product Development Process

Enacting the marketing concept requires enacting a good new product development (NPD) process. This process provides a systematic approach for bringing new products to market and incorporates customer input throughout. Deploying a quality product development process has been linked to achieving superior business results. Research indicates that the strongest driver of new product profitability is “*the existence of a high-quality, rigorous new product process.*”¹⁴ Details vary among companies, but the process usually follows a progressive series of steps from the initial idea stage through development and testing to commercialization and launch.

However, it is not enough just to have a product development process. The critical success factor is the *quality* of that process.¹⁵ It must be designed and executed well. While flexible, it does not cut essential corners in the haste to bring product to market. A recent study of best practices in product innovation identified key NPD principles that consistently contribute to new product success. The study found that high productivity businesses across industries practice these principles, while low or average productivity businesses use them far less.

Below are some of the top NPD principles that drive overall new product performance:¹⁶

1. *Customer focus* – product development *begins* with seeking direct understanding of the customer’s needs and *continues* using customer input throughout the entire process. One of the single largest contributors to new product success is identifying user needs and offering a compelling customer value proposition.

¹⁴ Robert G. Cooper and Elko J. Kleinschmidt (2007), “Winning businesses in product development: the critical success factors,” *Research-Technology Management*, May-June 2007, 53.

¹⁵ *Ibid.*

¹⁶ Robert G. Cooper (2006), “Formula for Success,” *Marketing Management*, March-April 2006, 18-24.

“The quest for unique, superior product begins with a thorough understanding of the customer’s unmet and often unarticulated needs – through in-the-field, voice-of-customer work.” (Cooper, 2006)

2. *Front-end homework* – the company conducts preliminary market, business and technical assessments upfront to guide the initial project go-ahead decision and product definition. This saves time in the long run and has been shown to enhance the statistical probability of success.

“Successful projects have more than 1.75 times as many person-days spent on predevelopment steps as do failures.” (Cooper and Kleinschmidt, 1993)

3. *Spiral development* – a series of customer feedback loops are built into multiple stages of the process, which can lead to product revision or evolution as new information is acquired.
4. *Holistic cross-functional teams* – representatives across major business functions are involved throughout the entire development process to share expertise and foster innovative thinking, directed by a carefully selected team leader who can champion the product.
5. *Metrics and continuous improvement* – the company establishes profit-and-loss and other performance metrics and regularly reviews results to find ways to solve problems and improve current and future products.
6. *A rigorous but adaptable development process* – the company institutes a process that defines steps from idea stage through launch, ensuring that the above principles are applied, while also allowing flexibility so that the time and resources used fit the level of project complexity and risk.

12. Key Steps in the New Product Development Process

This section outlines the NPD process referred to in Point 6 above, which takes the product concept from idea to commercialization. The precise structure of the NPD process varies among companies, but the 5-stage model described in this section contains the most common components. The model is intended to be both rigorous and flexible: stages can be combined or conducted simultaneously, depending on project risk, but quality of execution should be maintained.

Effective Go / Kill decision points are particularly important elements of this process. A prominent form of this screening approach is called the “Stage-Gate System.”¹⁷ Stage-Gate gets its name from the “gates” in between each stage of development. The purpose

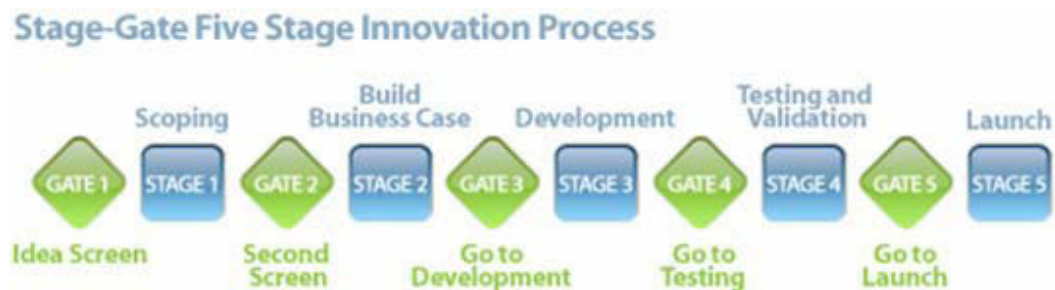
¹⁷ Please see various articles by Robert G. Cooper and co-authors cited in the References section.

of the gates is to determine which projects should be continued and which should not, based on pre-established qualitative and quantitative criteria. Each gate represents an investment decision about the worthiness of expending further resources on a product.

Using gates increases the likelihood of positive product performance, as only products with a strong business case and grounded customer appeal should be approved for continuing development and ultimately go to market. Screening out poor products saves on resources, as each new stage of development is increasingly costly and launching a product that fails is especially costly. Gate decisions are made by senior management based on information from the product development team. Gate reports do not need to be lengthy, but they should demonstrate quality work at each stage, present findings and risks in moving forward and detail the resources needed for further development.¹⁸

A brief description of the 5-phase Stage-Gate system follows below.¹⁹ The “Idea Screen” of Gate 1 depicts the initial management decision that a product idea meets sufficient strategic, market and feasibility criteria for further exploration. With that decision, the homework begins with “Scoping” in Stage 1.

Figure 5



Source: Stage-Gate Inc. - SG Navigator™

Stage 1. Scoping: This is the shortest and simplest front-end homework stage. A small technical and marketing team does preliminary market, technical and business assessments using mainly desk research, although it can also include focus groups or user concept tests. The analysis should identify general needs and opportunities, but remain open-ended about the potential product offering to allow for creative, innovative design in the next stages.

Stage 2. Business Case: Stage 2 is a more extensive homework stage to build the business case. It involves direct consumer research to identify user needs and wants (“voice of the customer” studies), competitive analysis, detailed technical assessment and financial analysis. The outputs include product definition (product concept, target

¹⁸ Robert G. Cooper (2008), “Perspective: The Stage-Gate Idea-to-Launch Process,” *JIPM*, May 2008.

¹⁹ Primarily drawn from R. G. Cooper and S. J. Edgett (2006), “Stage-Gate and the Critical Success Factors for New Product Development,” *BPTrends*, July, <http://www.bptrends.com/publicationfiles/07-06-ART-Stage-GateForProductDev-Cooper-Edgett1.pdf>.

market, and product benefits), the economic and business rationale for the product and a plan with budget and timeline for next steps.

Stage 3. Development: A cross-functional team of marketing, technical, financial and possibly sales people collaborate to design and develop the product. They do limited user testing to refine product details and they map out a launch plan, including marketing campaign and any staff training that might be required.

Stage 4. Testing & Validation: The product goes to pilot testing in selected markets to assess customer acceptance of the product and effectiveness of the marketing materials and delivery systems. Technical problems are debugged and the product and marketing materials are refined based on pilot test results. The goal is to have a product, marketing campaign and trained staff ready for launch.

Stage 5. Launch: The team moves the product to full commercialization through implementation of the launch plan. They monitor results and solicit feedback from customers and frontline staff for ongoing product and process improvements. This information may also lead to ideas for new products or line extensions.

13. An Exemplar: M-PESA and New Product Development

The case of how M-PESA was brought to market provides an excellent example of these NPD principles being put into practice, with impressive results. This section focuses on an external program because Opportunity International's m-banking ventures are still in development. A later section will present preliminary learnings from Opportunity International Bank of Malawi (OIBM), which is scheduled to launch m-banking in 2009, and from Banco Oportunidade de Moçambique (BOM), which has also explored m-banking. While some details of M-PESA as a telco-led rather than bank-led model may not be directly replicable, the principles employed and lessons learned in its development process are both transferable and highly instructive.²⁰

M-PESA was launched in March 2007 by Safaricom, Kenya's largest mobile network operator (MNO) and part of the Vodafone Group. M-PESA grew from 20,000 registered users in its first month to 2.075 million registered users within a year. A total of nearly \$221 million (KES 14.8bn) was transferred person to person in that year. \$44.8 million (KES 3bn) were transferred in March 2008 alone. Safaricom's financial reports do not break out M-PESA's contribution to revenue, but they do show that the portion of revenue driven by SMS / data – which includes M-PESA - grew by 14% in FY 2008.²¹ Motivated no doubt by the success in Kenya, Safaricom subsequently launched M-PESA in Tanzania in mid-2008.

²⁰ It is important to note that M-PESA is an *m-payments* rather than an m-banking program. Since Safaricom is not a bank, it cannot offer savings or loan products. Its focus is primarily on helping people to move money quickly and securely.


²¹ See Safaricom, "FY 2008 Financial Results Presentation," 27 May 2008, <http://www.safaricom.co.ke/fileadmin/template/main/images/FY%202008%20Financial%20Results.pdf>, accessed 15 October 2008. FX rate assumed is KES 67 = USD 1.

M-PESA is based on the simple value proposition of “Send Money Home” and is structured as follows:

- Any Safaricom customer can register as an M-PESA subscriber, with no bank account required and no sign-up fees. It operates on a “pay-as-you-go” basis.
- Registration and cash-in / cash-out transactions can be conducted at any of Safaricom’s M-PESA agents, which numbered over 4,000 at the end of 2008.²²
- KYC requirements are met through provision of an ID document at registration.
- Subscribers receive a free upgraded SIM card if needed, with their M-PESA account linked to their phone number plus a security PIN (all newly issued Safaricom SIM cards are M-PESA ready).
- The value of subscriber deposits is placed in an e-wallet associated with the phone number. Customers do not get a bank account and do not earn interest. Funds are held in a pooled account at Commercial Bank of Africa and are tracked through the M-PESA financial services platform.
- Money can be sent to both Safaricom and non-Safaricom customers, but transfers to the latter cost more.
- Subscribers can also use their M-PESA account to buy prepaid airtime.
- The M-PESA menu and transaction confirmations are in SMS mode. An example is given in Figure 6. The message on the left is the sender’s confirmation and the one on the right is the receiver’s notification of a transfer, which can be presented at a Safaricom agent for encashment.



Figure 6

Sending M-PESA value




In your M-PESA menu pick “send money” & enter

1. Recipient phone number
2. How much you want to send
3. Your secret PIN



You both receive SMS confirmation of the transfer

08/05/07 – WBZ

Source: Susie Lonie, “A brief introduction to M-PESA,” info.worldbank.org/etools/library/latestversion.asp?240201.

²² The current M_PESA agent numbers were given in the 11 December 2008 CGAP webinar on “Mobile Banking for Poor People: Pioneer Perspectives.” The archived video of that roundtable discussion can be accessed at <http://technology.cgap.org/2008/12/18/watch-the-video-mobile-banking-for-poor-people-pioneer-perspectives/>.

14. The M-PESA NPD Process and Principles

The process by which M-PESA was brought to launch incorporates nearly all the NPD principles that power successful companies. The pilot for M-PESA began in 2005 as a public/private partnership between Vodafone and the U.K.'s Department for International Development (DFID). The initial program in Kenya tested whether the mobile phone would be a useful tool for microfinance lending and payments, in cooperation with the microfinance organization Faulu. By the time M-PESA moved to commercial launch, however, the product had turned into something quite different. The following section describes the development steps and principles employed and how they shaped the final product.²³

Stage 1. Scoping: The idea that led to M-PESA began in 2003, as Dr. Nick Hughes, Vodafone's Head of International Mobile Payment Solutions, explored how his company could help address the Millennium Development Goals. He identified access to finance to fuel entrepreneurial activity as an area of need and looked for ways that mobile could bridge that gap in developing countries.

Hughes successfully drafted a project proposal for joint funding with DFID. One of his most important early decisions was to begin with a preliminary needs assessment rather than a functional product specification. The focus was on *first* understanding needs and then building a responsive product. Hughes also appointed a dedicated project manager, Susie Lonie, to lead work with relevant departments of Safaricom, including IT, Operations and Customer Care.

The scoping phase was more extensive than usual and included the beginnings of Stage 2 (Build Business Case). This was appropriate for the newness of the effort and the number of unknowns involved. It also illustrates that the NPD process can and should be used flexibly and efficiently.

The NPD team conducted workshops with banks, MFIs, technology suppliers, MNOs and government regulators to ask the question: "Assume that the technology can do anything you want it to, what are the biggest challenges you face in growing your business or increasing access to financial services?" Making customer access to finance easier and simpler emerged as a key issue in these discussions. This became the focus of the next stage of the team's activities.

²³ The principal source of information for this section is from N. Hughes and S. Lonie, "M-PESA: Mobile money for the 'unbanked.'" *Innovations*/Winter and Spring 2007, http://www.policyinnovations.org/ideas/policy_librarydata/m_PESA/_res/id=sa_File1/INNOV0201_pp-63-81_hughes-lonie_1.pdf.

NPD Success Principles employed in Scoping:

- Customer focus
- Front-end homework
- Holistic cross-functional team with specified team leader
- Rigorous, adaptable NPD process

Stage 2. Business Case: Having identified the general needs and opportunities in the Scoping exercise, Hughes formed a three-way partnership with Safaricom, the microfinance institution Faulu, and the Commercial Bank of Africa. The purpose of this partnership was to bring different, essential core competencies to the project: the MNO understood communications technology and had an extensive agent network to use as a distribution channel, the MFI was grounded in the target user market and the bank brought financial expertise and regulatory compliance to the table.

This partnership group developed the product definition. The product concept was to facilitate customer loan disbursements and repayments via the mobile phone, with the goal of making transactions as easy as topping up airtime. The target market was defined as the unbanked poor, and the product benefits were access and convenience. As the Mobile Commerce Project Manager, Susie Lonie was tasked with guiding the project to completion.

NPD Success Principles employed in Business Case:

- Customer focus – using the MFI as initial contact point
- Front-end homework
- Holistic cross-functional team with specified team leader

Stage 3. Development: Having outlined the product concept, the NPD team now began developing specific product details. These included a range of technical, regulatory and marketing decisions. The value of a multifunctional team came particularly into play at this stage, given the scope of issues that needed to be addressed. During this time Lonie involved staff from nearly all departments in Safaricom. The two groups most involved were Customer Service, which set up a help desk and dedicated call number for customer and agent inquiries, and Finance, to track and manage the movement of cash. Others departments that were called in to help included Engineering, Billing, Risk, Operations, Sales, IT, Marketing and Products & Services.

Some of the most important decision areas from the Development Stage are listed below. Not all of the decisions that the M-PESA team made will apply to other m-banking schemes – and in fact, some were changed after the pilot test. Every program will have its own set of business conditions that may lead to different conclusions. However, these are common elements that an m-banking NPD team will need to investigate and decide on, based on what will fit the local market best.

A checklist for major m-banking decision points is provided in Appendix II.

Technical decisions:

- *Systems capacity* – Determine the capability of the telecommunications provider’s back office systems to handle the m-payments service and make adjustments to system as necessary.
- *Financial service platform* – Decide whether to buy an existing off-the-shelf software package or develop a new one to interface with the bank’s and Safaricom’s systems. They hired Sagentia to do the latter, since available products lacked the desired functionality.
- *Consumer interface* – Decide on SMS, voice or another messaging system. In order to maximize user-friendliness and affordability, they chose menu-driven SMS compatible with the most basic handsets in the market. Since Safaricom owned the SIM cards, they could offer greater security via their SIM toolkit than is normally available on SMS).

Marketing decisions:

- *Agent network* – Recruit and train agents to handle cash deposits and withdrawals. Safaricom tapped into its own network of airtime dealers, but needed to add more in rural areas.
- *Test market* – Select initial consumer groups for pilot test. With Faulu, the NPD team chose representative microfinance groups in Nairobi and upcountry, going first with phone-literate groups to minimize user challenges.
- *Handset experience and languages* – Design a user-friendly handset menu and translate menus and SMS responses into local languages. The M-PESA menu is in English and Swahili. Adding the local language was particularly important for enabling rural outreach.
- *Product* – Determine what services the program will offer. The pilot started with microfinance loan disbursements and repayments, P2P transfers, cash-in/cash-out at agents and later added prepaid airtime.
- *Pricing* – Decide whether to charge an upfront registration fee, monthly fees and/or transaction fees. M-PESA has no upfront fees and uses a pay-as-you-go cost structure, charging a fee per transaction.
- *Customer support* – Set up help desk to provide support for customers and agents. Safaricom deployed Customer Service to set up a dedicated 24/7 call number and trained internal staff to understand the program, answer questions and help solve problems.

Regulatory/Risk Mitigation decisions:

- *KYC compliance* – Determine identification requirements and whether agents can register new clients. Kenya has a national ID, so this was sufficient for registration. Since no customer bank accounts are created with M-PESA, Safaricom agents were empowered and trained to sign up new clients.
- *Virtual money management* – Since Safaricom is not a bank, it had to ensure that all e-money was matched with real money in its pooled account at Commercial

Bank of Africa. The financial service platform was designed to ensure that cash holdings mirrored virtual money.

- *Security* – Identify appropriate client and agent security measures. Safaricom encrypted messages via its SIM toolkit and gave each agent and customer a dedicated PIN. Training was also provided to help clients understand PIN management.

NPD Success Principles employed in Development:

- Customer Focus
- Front-end homework
- Holistic cross-functional team with specified team leader
- Rigorous, adaptable NPD process

Stage 4. Testing & Validation: After developing the product specifications and necessary support structures, the pilot test began in October 2005. Five hundred microfinance clients were given phones and training on how to use M-PESA to repay loans. In addition, eight agent stores were given dedicated phones and training. In addition to repaying loans, clients could use the phones to deposit and withdraw cash, transfer funds, check account balances and add airtime.

Pilot Successes: The pilot demonstrated convincingly that there was demand in the market for a mobile payments system and that it had the potential to be commercially viable. It also showed that the newly developed financial services platform worked. M-PESA was less expensive for clients than other transfer companies such as Western Union, and more secure than the most common means of transferring money, such as via friends or bus courier. The NPD team observed that people used the service in a variety of creative ways: to pay for trades between businesses, to send emergency funds to people in need, to safely store cash while traveling and even as an “overnight safe” for businesses.

Susie Lonie observed that “we had evidence that the product functionality was right, both technically and commercially, to provide a service that could deliver a healthy profit and meet consumer needs, both in Kenya and other developing countries.”²⁴

Pilot Challenges: Along with the successes, a number of challenges emerged, which led to changes and improvements at commercialization:

1. *Clients:* The pilot program proved too complex for clients, especially for those who were less phone-literate. They found the many different transaction options along with PIN management confusing. As a result, M-PESA simplified the product at commercial launch.
2. *Agents:* It became clear that agents needed ongoing training and support. Despite prior training, agents were reluctant to pay out cash on the basis of an SMS

²⁴ Ibid., 77.

message. The NPD team made regular visits to ensure understanding of procedures and safeguards and later instituted an ongoing agent training and supervisory program. It also became clear that many more agents would be needed for a commercial launch, in order to provide true customer convenience and spur widespread adoption.²⁵

3. *Microfinance Institution:* The microfinance aspect of the pilot was the most problematic. First, Faulu's back office was not equipped to handle the electronic transactions, resulting in delays and duplicated work. Second, allowing clients to repay loans remotely appeared to reduce attendance at group meetings and negatively affect on-time payments.²⁶ Third, the existing M-PESA pricing model may not be a good fit for microfinance. Mark Pickens of CGAP suggests that M-PESA's pricing might be too costly for typical microfinance transactions, which are small and relatively frequent.²⁷ Microfinance was dropped for M-PESA's commercial launch.

NPD Success Principles employed in Testing & Validation:

- Customer focus
- Spiral development
- Metrics and continuous improvement
- Rigorous, adaptable development process

Stage 5. Launch: Important learnings gleaned from the pilot informed and reshaped M-PESA's launch, which took place in early 2007. These lessons included:

- The need to simplify the consumer product and message
- The value of convenience and security as key consumer benefits
- The need to build out the agent network for customer convenience
- The need for ongoing agent training
- The importance of an electronic interface with financial back-office systems.

Based on these learnings, the NPD team developed a simple value proposition, which was "Send Money Home." They identified as their initial target market those urban workers who send money home to rural family and friends. M-PESA was positioned as a safer, more convenient, and less expensive way to transfer money than the existing alternatives.

M-PESA product features were simplified. The team discontinued the microfinance function and reduced the products offered to only three:

²⁵ William J. Kramer and John Paul, "Mobile-enabled transactions for the base of the economic Pyramid: a brief review of the 2006 'state-of-play,'" *The Vodafone CR Dialogues #3: economic empowerment through mobile*, 13.

²⁶ Gautam Ivatury and Ignacio Mas (2008), "The early experience with branchless banking," CGAP Focus Note 46,10.

²⁷ Mark Pickens, "Can M-PESA work for microfinance clients?" CGAP Technology Blog, 28 May 2008, <http://technology.cgap.org/2008/05/28/can-m-pesa-work-for-microfinance-clients/>, accessed 16 June 2008.

1. Cash-in / cash- out transactions
2. P2P transfers
3. Prepaid airtime purchase

In order to support its convenience proposition, Safaricom recruited more distributors to become agents. The company also established agents in grocery stores, banks and gas stations. M-PESA had a network of 850 agent locations in its first year, three hundred more outlets than all the bank branches in Kenya.²⁸ It now has over 4,000 agents. This nearly ubiquitous agent presence is a significant driver for M-PESA's rapid uptake. It raises brand awareness and saves on time and transport costs for customers. Ongoing agent training and supervision have also become core parts of the program, in order to ensure customer service quality and update agents on new developments.

NPD Success Principles employed in Launch:

- All NPD principles have been employed at various stages in the process and have clearly benefited and informed M-PESA's launch. Therefore they do not require further enumeration, except to note that ongoing developments testify to Safaricom's application of the principle of *continuous improvement*.

M-PESA post-launch: As befits the principle of continuous improvement, Safaricom staff monitor program results and update the product and related processes. Just two of these are highlighted below:

- Agent cash float: Managing agent liquidity emerged as a concern. Rural agents in particular experience more withdrawals than deposits and sometimes run out of money. Like their clients, they have to travel long distances to get cash from a bank. Safaricom responded by putting systems in place with both agents and headquarters to better track and manage cash float, although the problem is still not fully solved.
- New products & partnerships: M-PESA is seeking to add international remittances to its product portfolio. This would be a much more lucrative source of revenue than the low-margin domestic transfers. The technical platform was already in place, but launch was initially stymied by regulators in the UK over AML/CTF concerns. However, Vodafone just announced in December 2008 a pilot for cross border remittances between the UK and Kenya in partnership with Western Union.²⁹ Presumably the latter company's track record in regulatory compliance was an important factor in gaining approval for this additional program.

²⁸ Ivatury and Mas, 7.

²⁹ Dianne See Morrison (2008), "Vodafone, Western Union Testing International Mobile Money Transfers," 8 December 2008, washingtonpost.com, <http://www.washingtonpost.com/wp-dyn/content/article/2008/12/08/AR2008120801156.html>, retrieved 19 December 2008.

To conclude this review of M-PESA as an exemplar for m-banking NPD, the link between a high-quality, systematic development process and program success should be evident. All the NPD success principles came into play as M-PESA moved forward from the initial concept that Nick Hughes proposed to DFID through commercial launch in Kenya and subsequently Tanzania and Afghanistan. Consumer response has outperformed all expectations. Certainly the telecommunication provider's technical capabilities contributed to the program's strength, but arguably the most important ingredient was the focus on the customer. This section closes with comments from the project manager, Susie Lonie, offering her view on what helped drive M-PESA's success:

*“This experience has... reinforced the insight that there is no substitute for spending a significant amount of time at the start of the project on the ground assessing customer's needs well ahead of designing the functional specifications of any technology-based solution.”*³⁰

PART IV. APPLICATION OF SYSTEMATIC NPD TO OPPORTUNITY INTERNATIONAL'S M-BANKING EFFORTS

15. Application: Opportunity International – Mozambique and Malawi

At time of writing, no Opportunity International banks have active m-banking programs yet. However, two banks in Africa – BOM in Mozambique and OIBM in Malawi – have investigated m-banking options for their markets, with the latter expected to launch in early 2009. This section offers findings and learnings from the preparatory work that has been done by these banks so far.

16. Banco Oportunidade de Moçambique (BOM)

BOM engaged the ING Microfinance Support Team in October 2007 to analyze market opportunities for m-banking in Mozambique. This scoping exercise included customer surveys, general market assessment, and research into technical options. The survey goal was to determine if there was an m-banking market for BOM in Mozambique and to measure consumer response to several proposed m-banking solutions. The consumer findings were generally favorable, but key m-banking enabling factors, such as access to a switch and strategic partnerships, are still in development. The project is therefore on hold until those necessary conditions are in place.

One of the most interesting survey results dealt with the issue of trust.³¹ Respondents indicated a positive level of trust in the bank and in m-banking technology, but they expressed concern about the trustworthiness of m-banking agents. While respondents said that access to agents would save time compared to using an ATM or bank branch, they felt that agents were not as safe or reliable and they expressed worry about agents knowing when the client is carrying cash. The issue of trust is a recurring theme in m-

³⁰ Hughes and Lonie, 80.

³¹ Daphne Hagen and Ad van der Poel, “M-Banking in Mozambique?” October 2007, ING Microfinance Support.

banking adoption around the world and the reliability of agent networks is an essential component in establishing consumer confidence and encouraging uptake.³²

17. Opportunity International Bank of Malawi (OIBM)

OIBM began investigating mobile phone banking in 2007 as a new avenue for addressing the needs of the rural poor. Similar to the situation in Kenya, OIBM observed that many urban residents in Malawi send money to relatives in rural areas. The bank saw an opportunity to use the mobile channel and the bank's delivery systems to provide a more secure way for money transfers, as well as for bill payments, deposits and account balance inquiries. OIBM also saw that client transaction fees could help the bank's revenue stream. As a result, the effort to develop mobile phone banking was incorporated in OIBM's business plan.

OIBM originally planned to launch mobile phone banking in mid- to late-2008, but the start is currently scheduled for early 2009. The reasons for and benefits of this delay were outlined by bank CEO, Aleksandr-Alain Kalanda, in a telephone interview in December 2008. Kalanda was asked to highlight the most important learnings from OIBM's m-banking efforts to date. He was also asked what advice he would give to other banks thinking about starting m-banking. His responses are given below:

- *Understanding client needs* is first and most important. OIBM used focus groups and surveys to get client input. People indicated a need for a cheaper and more convenient way to pay loans, make transfers and pay bills. Specifically, clients needed easier ways to move money around and to buy airtime, especially on weekends when airtime distributors are closed. OIBM's m-banking program is structured to move into that space.
- *Research* into existing m-banking efforts was the next step. OIBM drew a lot of lessons from the Kenyan experience with M-PESA and South Africa's WIZZIT. Bank officers traveled to those countries and spoke with those companies to understand and experience how m-banking is done. OIBM also reviewed CGAP studies (some of which are listed in Appendix I) and conducted additional field research. Results indicated that going the cell phone route would bring down costs to the bank and to customers. The m-banking model that was evolving would fit with OIBM's existing business model of a low margin, high volume business.
- *The need to engage external m-banking expertise* became clear as the program moved forward. OIBM management discerned that they did not have sufficient experience in-house to design all the technical and program aspects of m-banking, so they engaged the consulting firm Bankable Frontier Associates (BFA) to assist them. Although this delayed implementation, Kalanda believes that BFA's recommendations resulted in significant improvements over the bank's initial

³² Please see the article by Olga Morawczynski, 'Exploring trust in mobile banking transactions,' for additional findings on this important issue.

plans and saved the bank money. In other words, taking the extra time to do high-quality front-end homework paid off for OIBM.

Some of the key changes resulting from BFA's consultancy are as follows:

1. Additional revenue-generating offerings. OIBM was originally thinking of just implementing an SMS informational message system, with possibly a few simple transactions. However, BFA showed them that they could also sell phone airtime and generate more transaction fees. (In fact, studies consistently show that one of the primary uses of m-banking is for airtime top-up.) OIBM already sells airtime via its ATMs and adding this function to m-banking could bring in commissions from 4%-7% of sales.
2. Pricing. BFA helped OIBM understand their pricing options. One option was to charge customers a "ledger" fee; that is, a monthly fee to cover unlimited transactions. The other was to charge on a "pay-as-you-go" basis. The customers would pay for their SMS message portion and the bank would pay its part of the messaging, getting a discounted rate from the MNO. Although OIBM has done better with ledger fees for its other products, the bank is opting for the "pay-as-you-go" model for m-banking, similar to most other m-banking schemes.
3. Messaging channels. Since OIBM was expanding beyond the originally intended informational services into transactional m-banking, the bank needed the right technological tools and platforms to provide additional security for clients and the bank. Security needs had to be balanced with the technical capabilities of most local handsets and with cost. GPRS was not appropriate because few local phones are that high-tech.³³ Voice was too expensive. Therefore, BFA helped the bank to settle on SMS for information-only messages and USSD2 for transactions. Those two channels offered the best solution in terms of security, availability and affordability.
4. Systems interface. BFA also helped OIBM management understand the overall m-banking systems architecture and the functional requirements for the mobile channel manager (MCM). The MCM is a server that interfaces with the MNO's SMS and USSD servers and the bank's portfolio management system and is usually supplied by an external technology vendor.

Lessons learned. With respect to lessons learned and insight to share with other banks, Kalanda emphasized that setting up an m-banking system is not as easy as it sounds. In addition to understanding client wants and needs, one must also understand the *security* and *technical* issues. These include issues regarding the MNO, the technology platform vendor and the bank's own back-office system.

³³ GPRS is a mobile data service that supports internet communication services such as email and web access. SMS (short messaging service) allows users to send and receive text messages on their mobile phones, while USSD2 (unstructured supplementary service data) is an interactive message system that allows two-way dialogue between the network and the user, similar to instant messaging. USSD provides a higher level of security than SMS, but does not significantly increase user fees.

- Technology Partners. Local MNOs may lack expertise in m-banking, so it is important for the bank to educate itself in order to help guide negotiations and specify technical requirements. The technology platform vendor should have a good track record in designing and implementing an interface in environments similar to the one the bank is operating in. The bank's back-office system needs to be PIN-enabled and capable of handling the volume and nature of m-banking data. The entire system must be secure and reliable, as delayed, dropped or erroneous transactions will damage consumer confidence. Bank data integrity must also be protected.
- Agent network. OIBM also had to begin building an agent network. Since the Malawian economy is cash-based, eventually every transaction needs to be turned into money. Agents are important cash-points and the goal is to be virtually present everywhere. Towards this end, OIBM is negotiating agreements with a chain of stores across the country to operate as cash-out agents for the m-banking scheme.
- Consumer issues. On the consumer side, OIBM found that local people, even if illiterate, are highly skilled at using their phones, which should facilitate m-banking adoption. At the same time, Kalanda noted the importance of keeping the initial program offerings simple. The emphasis should be on getting things right at the beginning and not frustrating clients and incurring reputational damage and potential business loss. Therefore the first products to be rolled out will be informational messages (such as account balances), P2P transfers and airtime purchases. Once the system is established, OIBM will add bill payments and merchant purchases.
- Regulation. With respect to regulation, only OIBM clients will be able to participate in its m-banking scheme at present. They will go through the standard bank identification procedures to comply with KYC requirements. OIBM is discussing AML/CTF measures with the Central Bank, in order to ensure that regulations do not "use a hammer to kill an ant." In other words, typical transaction amounts for OIBM clients are too small to warrant significant controls and the bank is trying to encourage the authorities to enact proportionate regulation that does not stifle innovation and outreach.

OIBM's experience and learnings with m-banking will be further documented upon launch. Bank management believes that OIBM must go into m-banking in order to remain competitive. They have built a business case and laid the technical foundations for the program, which should reduce transaction costs, increase revenue and augment outreach to customers who cannot access OIBM's physical outlets. Their target market includes the unbanked and underbanked of Malawi, most of whom live in rural and peri urban areas of the country. OIBM hopes that m-banking transactions will generate enough income to subsidize free savings accounts for the poor. If successful, OIBM's m-banking program should be both profitable for the bank and transformational for the people of Malawi.

APPENDIX I

RESOURCES FOR ADDITIONAL INFORMATION

Technology

The technology choices and potential business structures among key players are outlined in detail in “Mobile Banking Technology Options,” published by FinMark Trust in 2007: http://216.239.213.7/mmt/downloads/finmark_mbt_aug_07.pdf.

The trade association GSMA has also published a mobile banking vendor analysis that could be helpful in evaluating potential technology platform providers: http://www.gsmworld.com/documents/2007_GSMA_Mobile_Banking_Vendor_Analysis_Overview.pdf.

Consumer Issues

The researcher Olga Morawczynski has written several articles from the field about m-banking consumer adoption in Kenya. One discusses the reasons for M-PESA’s rapid uptake and the other investigates the important issue of consumer trust:

- “Why has M-PESA become so popular in Kenya?” CGAP Technology Blog, 17 June 2008, <http://technology.cgap.org/2008/06/17/why-has-m-pesa-become-so-popular-in-kenya/>.
- “Exploring trust in mobile banking transactions: The case of M-PESA in Kenya,” <http://www.nextbillion.net/files/Morawczynski%20and%20Miscione-%20GATES.pdf>.

Please refer to the [References](#) section for the study by Gautam Ivatury and Mark Pickens on consumer adoption of WIZZIT in South Africa.

CGAP

CGAP has published numerous articles on various issues related to m-banking. A few of these are listed below:

- “Banking on Mobiles: Why, How, for Whom?” (2008) by Ignacio Mas and Kabir Kumar, Focus Note 48, <http://www.cgap.org/p/site/c/template.rc/1.9.4400>. Addresses how a smaller bank or MFI can get started with m-banking.
- “Banking through Networks of Retail Agents” (2008) by Ignacio Mas and Hannah Siedek, Focus Note 47, http://www.cgap.org/gm/document-1.9.3922/FocusNote_47.pdf.
- “The Early Experience with Branchless Banking,” (2008) by Gautam Ivatury and Ignacio Mas, Focus Note 46, http://www.cgap.org/gm/document-1.9.2640/FocusNote_46.pdf.

The CGAP technology blog is also an excellent source for up-to-date m-banking information: <http://technology.cgap.org/>.

Other Resources

There are far too many publications on m-banking to mention here. However, I will note “The Enabling Environment for Mobile Banking in Africa” by David Porteous of BFA, which addresses a range of issues from technical to regulatory and is listed in [References](#).

APPENDIX II

CHECKLIST FOR M-BANKING DEVELOPMENT

Please note that this is not an exhaustive list, but a preliminary guideline with basic questions that should be asked when developing an m-banking program.

Regulatory Issues and Risk Mitigation

1. How will KYC requirements be satisfied?
2. What kind of limitations on number and size of transactions will be placed to meet AML/CTF requirements and to mitigate general security risk?
3. What kind of fraud monitoring scheme will be implemented?
4. If considering international remittances, what kind of international regulatory issues need to be addressed?
5. Are there any telecommunications regulations to be aware of?
6. What kind of PIN and other client security measures will be enacted and how will clients be educated to understand and properly use them?
7. How will agent liquidity and security be maintained?
8. How will bank data integrity be protected and systems outages managed?

Technical

1. What is the mobile network operators' technical and systems capacity to handle m-banking and the volume of data flow?
2. What kind of financial service platform would serve best as an interface between the MNO and the bank's back office system? Who would be the best provider for this platform for configuration, implementation and support?
3. What kind of consumer interface is the best choice for handset availability, security and cost, e.g., SMS, USSD, IVR?

Marketing

1. Who is the target market and what problem(s) can m-banking solve for them?
2. What is the m-banking value proposition and does it offer better value than customers' existing formal or informal alternatives?
3. What products are most easily understood for quick market take-up?
4. What message and media outlets would best serve to inform and attract customers and new clients to the new m-banking service?
5. Consumer handset experience – What languages should be available? What is the most user-friendly menu format for customers?
6. Pricing – What pricing approach should be used, e.g. monthly fee versus pay-as-you go? Can the bank negotiate a bulk tariff with the MNOs to keep prices low?
7. Agents – How will the bank build out an agent network (recruit, train, maintain quality control and compensate) to enable outreach and cash-out transactions?
8. Customer Support – What kind of help desk and problem resolution services will be offered? What kind of staff training will be provided so they can assist customers?

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Opportunity International

GIVING THE POOR A WORKING CHANCE

Chapter Four

Overcoming Back-end Barriers: Towards a Bank

Switching Solution for Africa

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1. Overview

Opportunity International aims to use technology and a variety of distribution channels to reach the rural poor with financial services in a sustainable and scalable manner. The lack of banking facilities for the poor – and especially the rural poor - in sub-Saharan Africa is well known: less than ten percent of the population in almost any African country is banked or integrated into the formal financial system. Both commercial banks, which traditionally have served only the wealthy elite and large businesses, and microfinance institutions focused on the poor tend to be centered in easier-to-reach urban and peri-urban locations. Extending into and achieving scale in rural Africa has proven to be a perennial challenge, with thinly scattered populations in hard-to-reach areas and poor to non-existent infrastructure rendering traditional delivery channels such as bricks-and-mortar branches cost-prohibitive, if not impossible. As a result, microfinance providers are increasingly moving towards what CGAP terms “branchless banking” solutions to serve rural areas in a sustainable manner at scale.

Opportunity International’s response to this challenge of providing the rural poor with financial services – that is, “bringing the bank to the people” – is to utilize multiple alternative delivery channels such as mobile banks, kiosks, ATMs and POS terminals, as well as mobile phone or “m-banking” (which will be discussed in a separate paper) to reduce cost and facilitate widespread geographic outreach. There are many enabling factors involved, but one core component is finding and employing appropriate technologies that address essential back-office, infrastructure (e.g., power and connectivity) and consumer interface needs. This paper focuses on a key back-end enabler, namely a *switching or payments system* that can drive ATMs and POS terminals, connect to other bank networks and potentially support the introduction of m-banking as well as the capacity for international remittances. Poorly functioning and costly national payments systems, and oftentimes their complete absence in many African countries create a back-end barrier that hinders deployment of delivery channels that could more effectively and extensively reach the rural poor.

This paper documents Opportunity International’s work towards a switching solution for Africa. Opportunity International’s MIS/ICT leadership has adopted a “trailing edge” technology strategy that leverages the latest, proven commercial banking, information/communications and other technologies for the banks’ technology needs. These include internal systems, infrastructure, and external interface with both the wider banking community and Opportunity’s target market, namely the underserved and unserved poor. This strategy translates valuable R&D investment and learnings from the commercial sector into effective, lower-cost applications for Opportunity banks. While these technologies have a successful track record in the commercial arena, many of them are new or nascent in microfinance, and some, such as the switch, are still in process of investigation and implementation.

As a result, this paper presents a work-in-progress, outlining the goals, proposed technology solution, outstanding questions to be answered and next steps to be taken in order to provide Opportunity banks in Africa with a replicable model for this essential back-end enabler. If successful, this switching system could not only support

Opportunity International banks in the region, but also potentially help integrate other microfinance institutions into a national – and possibly even global - payments network, bringing extensive rural outreach closer to reality.

2. African Context: Back-end Barriers

There are three common back-end barriers for microfinance banks in Africa which inhibit rollout of lower-cost delivery channels such as ATMs and POS devices. The first is the lack of a core banking system with real-time access for managing transactions outside the banking hall (which Opportunity International has addressed by installing eMerge, its portfolio management system). The second is the lack of a switch that can drive ATM and POS devices, that is, communicate between those external machines and the core banking system. The third is the lack of a network switch that connects a bank to the ATMs and POS terminals of other banks and to other interbank networks. Whereas in developed economies there are often multiple network switches (e.g. VISA, Cirrus, etc.), there may be only one network switch – if any at all – in developing countries. In cases where a network switch exists, it may serve only the large commercial banks and exclude smaller banks and microfinance institutions. Some Central Banks in Africa have sought to address this gap by funding a network switch either wholly or with private sector partners. As a result, the term “national switch” is sometimes used interchangeably with “network switch” in the African context.

To illustrate the back-end challenges, in countries such as Mozambique a national network switch is not available. If a Mozambican bank such as BOM opts to install ATMs, its customers will be restricted to using only this one bank’s machines, the number and geographic coverage of which will be restricted by the bank’s capacity to build out a stand-alone system. However, even if a national switch does exist, other challenges can arise. For example, while Malawi has Malswitch, a national switch company wholly owned by the Central Bank, its system has the drawbacks of using proprietary technology that not only is expensive with respect to subscriber fees and the use of SmartCards – at a cost of \$5-\$7 per card – but also lacks interoperability with other domestic or international payments systems.

The commercial bank solution for establishing payments systems commonly is to form consortia with other banks to set up a network switch or to adopt a stand-alone strategy to drive only the bank’s own ATMs. The experience thus far is that commercial bank consortia in Africa are not interested in integrating microfinance banks into their network switches, although that may change in the future as more commercial banks recognize opportunities in the microfinance sector and seek to downscale and/or partner with MFIs.

The barriers to satisfactory ATM and network switching options in Africa, whether owing to lack of availability, high cost or closed systems, has led Opportunity International to look for alternatives that can support the goal of rural outreach. A company in the Philippines, Nationlink, was identified by Daryl Skoog, Vice President for MIS/ICT, as a potential source for microfinance switching solutions. Opportunity International representatives met with Nationlink in April 2008 in Boracay and July 2008 in Manila to explore how that company’s technology could help facilitate the extension

of banking services to rural Africa. The latter meetings were attended by Africa regional, OIBM (Malawi) and Opportunity Network MIS management, with a view to developing a regional switching strategy as well as an immediate country-specific solution for Malawi which could be implemented quickly.

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 government, Simtel nearly went under in 2004 when several consortium banks were taken over by international investors and one bank, BCDI, collapsed. The government’s majority share of Simtel was reduced to 8 percent when it sourced the German-based African Development Corporation (ADC) to invest \$3.5 million for a 70 percent shareholding. Both the government and the World Bank are also investing 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 time of writing, the initial informal proposal of \$15,000 per month would be prohibitive for many, if not most, microfinance institutions. There were only 17 ATMs in all Rwanda as of March 2008.

Sources: G. Majyambere, “Simtel targets 1m cardholders by 2010,” The New Times, 21 March 2008, <http://newtimes.co.rw/index.php?issue=13476&article=5041>, retrieved 28 April 2008; K. Esiara and J. Gahamanyi, “Queues in Banking Halls: 100 ATMs to be installed,” The New Times, 15 March 2008, <http://newtimes.co.rw/index.php?issue=13470&article=4893>, retrieved 1 May 2008; and Urwego Opportunity Bank of Rwanda Business Plan [Draft], 7 March 2008.

3. Technology Goals

The July 2008 Nationlink discussions covered not only technology options, but also the strategic purposes which this technology should serve and related desired features. It was agreed that the overarching goal that should inform technology decisions is *to reach as many people as possible at low cost*. Developing a financially inclusive system entails moving forward on multiple delivery channels to provide various banking services, including building in a capacity for “monetization,” that is, providing people with the ability to turn electronic value whether on cards or mobile phones into cash. Most African economies are still primarily cash-based, which mandates establishing “a geographic spread of mini-points of monetization.” These mini-points would be ATMs and POS terminals operated by Opportunity International banks or agents in such outlets as grocery or general stores and gas stations.³⁴ This strategy in turn necessitates installing cost-effective, reliable ATM/POS drivers where needed as soon as possible.

Other goals that were enumerated in the Manila meetings included:

- Interoperability or multi-system capacity to connect with other networks
- Standardized Africa-wide solutions in order to be able to provide regional or global technical support

³⁴ The use of agents and development of agent networks will be discussed further in another planned paper, but some of the issues that arise regarding agents are recruitment and compensation, regulation, the risk of fraud, physical security risk to the agents themselves, and liquidity management.

- Biometric capability
- Speed of transactions processing
- Speed of systems installation/implementation
- Ability to “control one’s own destiny” and not be reliant on monopoly providers
- Positioning Opportunity banking systems to be flexible to respond to future eventualities
- Adequate security to protect accountholders, bank data and operations
- Meeting local legal/regulatory requirements including KYC
- Understanding local business environment(s) to determine potential of establishing our own network consortia
- Determining risk of exclusion if an Opportunity bank leaves its current network (where applicable)
- Low-cost cards that can be distributed to clients free of charge
- Building in capacity to merge with credit scoring system planned for the future

4. Switching System: Components and Functions

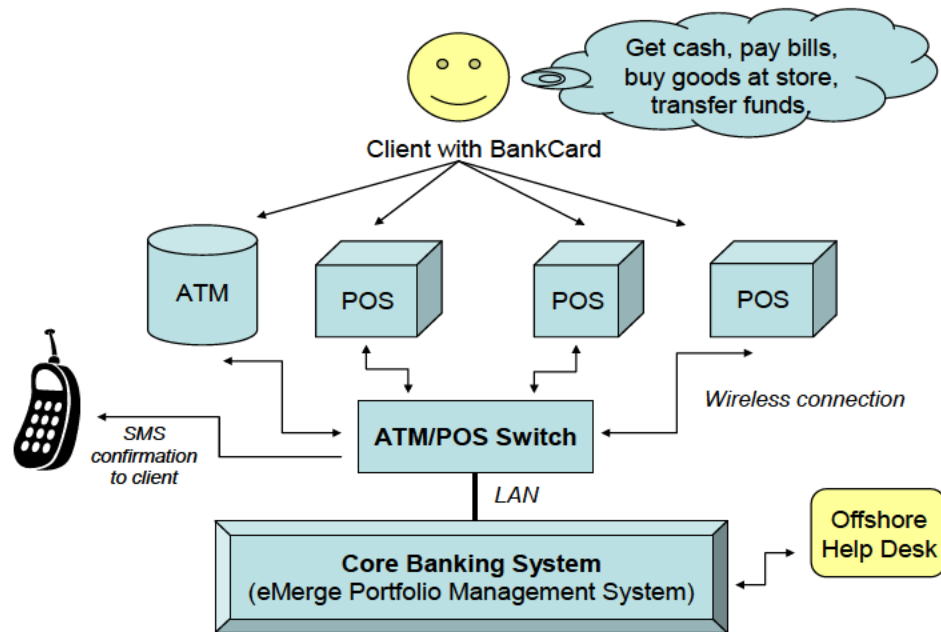
There are two primary components to the switching system under consideration, (1) the ATM/POS switch and (2) the network switch. The functions of each are described in the sections that follow.

4.1 ATM/POS Switch

An ATM/POS switch or driver is needed to communicate between the external devices (ATMs or POS terminals) and the core banking system. This switch’s function is to verify cardholder identification and to send electronic messages between the external device and the core banking system to answer account balance enquiries and authorize and record transactions. The connection between the external devices and the switch can be either wired or wireless, the latter feature an important enabler for rural expansion given relatively extensive wireless coverage in most African countries compared to limited landline availability. This switch can be installed on a stand-alone basis if necessary to drive just a bank’s own devices, although coupling with a network switch would be more desirable for reasons given in the next section.

The ATM/POS switch can be housed either on- or off-site, depending on local conditions and strategic/business decisions, and can be connected to the core banking system via LAN or wireless. While Opportunity International banks do not offer m-banking as yet (although several have projects in various stages of development), it is technically possible to program the switch to send SMS confirmation to accountholders of transactions such as fund transfers received. The diagram below illustrates a potential model for an Opportunity International bank in Africa, with the ATM/POS switch configured to interface with eMerge, which in turn is supported 24/7 by the MIS offshore help desk.

Figure 1



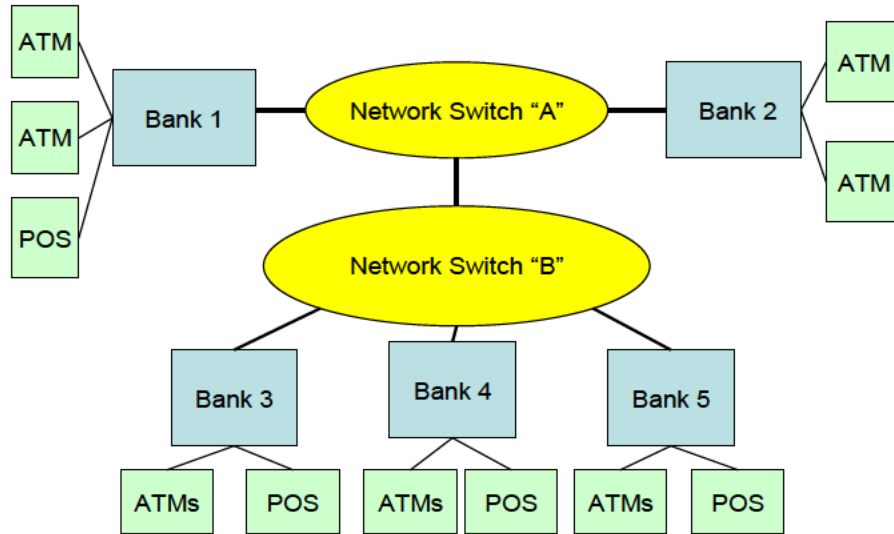
4.2 Network Switch

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, for example, the switch communicates the identification, authorization, transaction and settlement information between the machine and the two banks' data in their core banking systems. This linkage effectively multiplies points of outreach and leverages the greater banking community's investments in infrastructure, which could significantly increase financial access for the poor.

While customers pay a higher transaction fee when they use other banks' machines, their cost should be offset by enhanced convenience and reduced travel time and expense. In addition, from the bank's perspective, network participation can contribute to the revenue stream whenever customers from other banks use its machines, as OIBM has found. If Opportunity International were to install its own switching system, it could also give the banks greater control over the fee structure, allowing them to set customer charges at appropriate levels to enable access, while also covering operating expenses to ensure sustainability.

The diagram below shows the potential "multiplier effect" of connection to a network switch, and the effect of that switch in turn being connected to other network switches. The set-up allows a customer of Bank 1 not only to use the ATMs of the other bank on Network Switch "A," but also to use the ATMs of all banks on Network Switch "B."

Figure 2.



Multiplier Example: OIBM currently operates 23 ATMs and 15 POS terminals. However, its cardholders have access to a total of about 45 ATMs and 1200 POS terminals nationwide owing to OIBM’s participation in the Malswitch network, which includes three other banks at present. In other words, integration into the national payment system gives OIBM customers access to *double* the number of ATMs and almost *one hundred* times the number of POS outlets than OIBM has on its own.

5. Global Integration

An internationally compliant network switch offers the potential of connecting to the global payments system. Integration into a global network would provide customer access to international remittances. Cross-border remittances are a growing market opportunity as well as poverty alleviation tool, with over 200 million international immigrants worldwide transferring \$369 billion in 2007, with an 8% CAGR in recent years.³⁵ However, cost, regulatory and others issues may make this a longer-term goal. The general consensus is that running Opportunity banks’ own ATMs and having a national switch takes higher priority in the short- to medium-term. Even if global integration is not a present option, though, *interoperability* on both the national and international levels should be factored in when deciding what systems to deploy.

³⁵ Alte Group, LLC, 2007. Cited by Christina Gold, President and CEO, The Western Union Company, in GSMA Mobile Money Summit presentation, “Expanding Markets – Transforming Lives,” 15 May 2008. Available at: http://www.mobilemoneysummit.com/documents/day_two/christina_gold.pdf.

6. Glossary

Since the discussion of a payments switch involves both banking and technology terms that may be unfamiliar to readers from different disciplines, a few key terms are defined below in order to aid understanding of the presentation that follows:

- **EMV** – *The designation EMV comes from the initial letters of Europay, MasterCard and Visa, the three companies that developed the standard. It 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.*³⁶
- **Interoperability** – *The ability to exchange and use information (usually in a large and heterogeneous network made up of several local area networks).*³⁷ *The ability of software and hardware on multiple machines from multiple vendors to communicate.*³⁸
- **ISO 8583** – *The International Organization for Standardization standard for systems that exchange electronic transactions made with payment cards. It defines the message format and communication flow between systems to authorize and record these transactions. Most ATM transactions use ISO 8583. Although ISO 8583 defines a common standard, it is typically adapted by each network with custom fields and usages. This customization necessitates a document acquisition and configuration process to link different ISO 8583 systems up with each other.*³⁹
- **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 is to prevent identity theft fraud, money laundering and terrorist financing.*⁴⁰
- **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 card number is stored on it by modifying the magnetism of the iron-based particles on the magnetic band and information is retrieved by swiping the card through a reader. Signature-based magstripe cards are at higher risk for fraud than EMV cards. That risk is mitigated somewhat by the use of PIN at POS cash-back devices and encryption algorithms such as Triple-DES.*⁴¹ *Magstripe cards can be configured for biometric and/or PIN authentication, which information*

³⁶ <http://en.wikipedia.org/wiki/EMV>, accessed 22 July 2008.

³⁷ Dictionary.com. WordNet® 3.0. Princeton University. <http://dictionary.reference.com/browse/interoperability> (accessed: July 23, 2008).

³⁸ Dictionary.com. The Free On-line Dictionary of Computing. Denis Howe. <http://dictionary.reference.com/browse/interoperability> (accessed: July 23, 2008).

³⁹ http://en.wikipedia.org/wiki/ISO_8583, retrieved 22 July 2008.

⁴⁰ http://en.wikipedia.org/wiki/Know_your_customer., retrieved 24 July 2008.

⁴¹ http://en.wikipedia.org/wiki/Magnetic_stripe, retrieved 22 July 2008

would be stored on the switch database, rather than on the card itself. This requires online access to the switch, a consideration for countries with unreliable infrastructure.

- **Smart Card** – *The Smart Card (often referred to as “Chip and PIN”) contains a chip that can hold substantially more information on the card itself than the magnetic stripe card, including biometric identification and a certain amount of transaction history. Its benefits include offline capabilities and high security protection. An institution must use Smart Cards in order to be EMV-compliant. However, not all Smart Cards are configured to EMV standards and therefore may not be interoperable with that system.*

Smart Card vs. Magnetic Stripe Card: There has been considerable discussion within Opportunity International about the value of using Smart Cards versus Magstripe cards. OIBM was compelled by its current network provider, Malswitch, to use Smart Cards that contain a proprietary, non-EMV chip. The security and offline benefits from this card are significantly offset by its high cost, at about \$5-\$7 each from the Malswitch supplier.

Recent consultant findings for OIBM suggest that local security risk levels and limited actual offline use may not justify the extra cost of the card, which is further exacerbated by its lack of interoperability. This judgment is also corroborated by findings from Concern Worldwide’s 2006/2007 Dowa Emergency Cash Transfer project in Malawi, conducted in cooperation with OIBM and with financing from DFID. While the cash transfer and Smart Card approach “enhanced the developmental impact of the project,” the assessment indicated that it could be improved through the use of more “flexible and affordable” transaction services.*

Magstripe cards come at considerably lower cost, at about 25 cents each in bulk. This low price point could enable free distribution of cards (most African banks charge their clients for cards), offering potential competitive advantage in many markets and enabling outreach to the rural poor, who generally could not afford the Smart Card fee and would thereby be blocked from accessing the very services Opportunity seeks to offer them. As mentioned previously, magstripe cards can also be configured for biometrics, with the data points for the fingerprint ID stored on the switch database rather than on the card.

**Sources: ExactConsult, Craig Kilfoil and Charles Loots, “OIBM Card Strategy Report,” submitted to OIBM March 2008; and Siana Strategic Advisors, Roland Pearson and Craig Kilfoil, “Dowa Emergency Cash Transfer (DECT) Wider Opportunities Evaluation and Recommendations,” submitted to Concern Worldwide and DFID-Malawi June 2007.*

7. Proposed Switching Solution: Nationlink Network

Opportunity International is teaming with the Nationlink Network (Nationlink) in the Philippines, a private sector initiative aimed to deliver electronic banking services to

remote areas of that country. Nationlink debuted in May 2006 and is a product of InfoServe Inc., a banking technology provider that serves most of the major commercial banks in the Philippines. Nationlink's unique focus on and experience with smaller, rural institutions (such as thrift and co-op banks, savings and loan associations, and NGOs) along with its robust technology make 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."⁴² Towards that end, Nationlink developed a low-cost ATM/POS driver (called InfoLite) and network switch for these previously excluded financial institutions, which links to the country's commercial banking networks. The common package costs about \$80,000 and includes the ATM and POS software that drives these devices and switching software that connects the institution to the national payment system structure, plus training, installation and a new ATM. This allows even small institutions to offer full ATM services with connection to the 7,000 ATMs of the top tier banks in the Philippines, as well as to ATMs and POS devices run by Nationlink members. Broad national access helps enable urban-rural funds transfers and reduces the rural cardholder's travel cost and security risks incurred when carrying large sums of cash for long distances.

The financial services that the Nationlink system and devices can support include:

- Cash card loading/reloading
- Cash transfers
- Loan/payroll disbursements
- Loan collections
- Cash-in/cash-out
- Airtime reloads
- Bills payments

7.1 Nationlink Technical Features

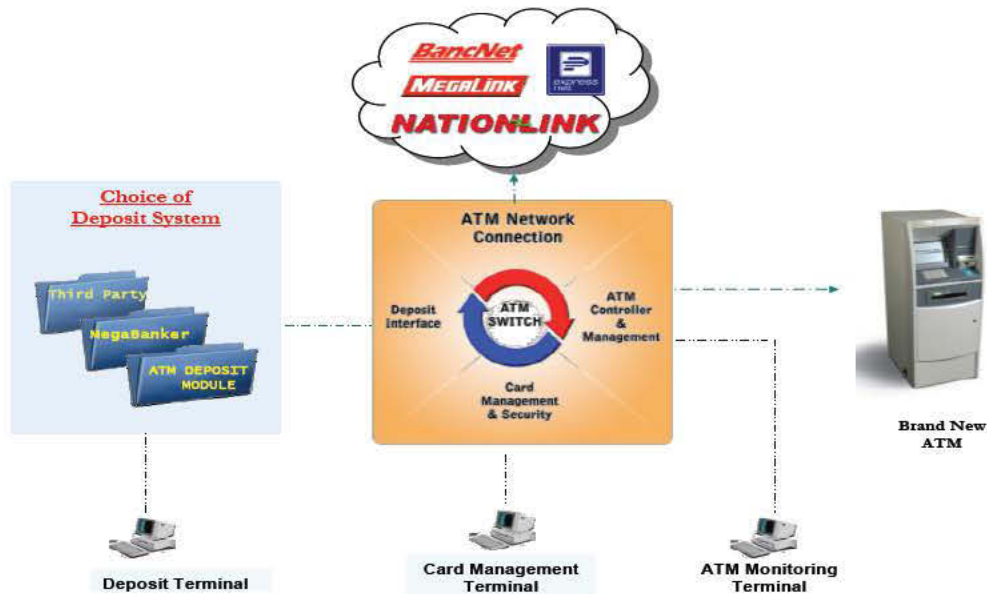
Nationlink had to meet both technical and Central Bank regulatory/legal requirements in order to launch this offering. Nationlink is an online, real-time settlement system and is ISO 8583-compliant and EMV-ready. It employs the less-expensive magnetic stripe card and can use biometric identification if desired for both ATMs and POS devices. It has already implemented biometrics for network members.

Nationlink is configured to drive Diebold Opteva 500 series and NCR Persona ATMs, as well as PC-based and wireless POS devices. Both the ATMs and the POS terminals can be configured for biometrics. Opportunity International is testing ATM machines that it has purchased from Nationlink for potential deployment globally. These machines are manufactured in China at competitive rates and have a modular architecture that can incorporate biometric identification readers. The ATMs also have the ability to take cash

⁴² B. Berida, "Banking Innovations, Lux Offers," BusinessWorld, 27 June 2008.

deposits in local currency and credit the account of the cardholder. The Nationlink ATMs are also EMV-ready and therefore interoperable with EMV networks.

Figure 3



7.2 Nationlink and Regulation

With respect to regulation, Nationlink’s biometric capability aids compliance with such requirements as KYC/AML/CTF, as the system quickly searches the database whenever new accounts are opened and denies applications if duplicate fingerprint records are found. This feature is particularly helpful in rural areas where official identification documents are often limited and could possibly be used towards KYC-compliance in Africa as well (a current regulatory “hot topic” particularly with respect to the emergence of m-banking). All institutions seeking to join the Nationlink Network in the Philippines must meet minimum CAMEL (Capital adequacy, Asset quality, Management, Earnings and Liquidity) ratings. In addition, the Central Bank requires Nationlink to maintain minimum reserves and capitalization levels, similar to a financial institution, to ensure financial viability and ability to settle the smaller participants’ transactions in event of their failure or default.

7.3 Nationlink’s Business Model

Nationlink derives its revenues from one-time system sales (about \$80,000 per system) and recurring revenues from annual subscriber/membership fees, card, and transaction fees. The network receives revenues whenever a transaction goes through the network and whenever Nationlink cardholders transact in other interconnected networks (issuer fees) or cardholders of other networks transact in the Nationlink Network (acquirer fees). The fees are modest in light of the target market and some fees can be waived for internal transactions, such as a Nationlink cardholder loading a card for value on a Nationlink

ATM. Fees are split amongst the network, issuing and acquiring banks, and agent where applicable.

8. Questions Raised and Provisional Answers

Many strategic and tactical questions arose in the course of July meetings. Because the switch strategy is a work in progress and because some issues are still under review, a number of the more important questions and provisional answers are given below, to help guide further analysis, show areas for follow-up and provide a simplified “learning history” of the assumptions and reasoning that will ultimately lead to the final technology/business decisions. This provides a record for future reference and against which the organization can assess results and formulate new learnings.⁴³

1. *Should the system be EMV-compliant and should Opportunity banks join with VISA/MasterCard?*

It is too expensive to become a VISA card issuer or acquirer. We would need to be able to clear transactions internationally, which is also very expensive. EMV is not necessary for Opportunity’s target market in the near- to medium-term for either security or global connectivity. With a system such as Nationlink, Opportunity banks can port into EMV systems without directly joining VISA or MasterCard.

2. *What are some legal and cost consequences if Opportunity banks are linked to EMV networks?*

It is important to be aware that in Europe, liability standards dictate that the weakest link is liable in the event of fraud. If Opportunity International banks were ever to connect to EMV networks, not being EMV-compliant could carry greater liability risk. In addition, high international settlement fees are incurred if a foreigner with an international VISA card uses our ATMs. Therefore any banks with VISA connections should at least for now ensure that their machines take only locally issued VISA cards and do not accept international VISA cards. Domestic VISA interchange fees can be negotiated with local banks. Commonly the charge to the customer is one percent over the agreed interbank charge, so for example if the bank interchange fee is 4%, then the customer is charged 5%.

3. *Should Opportunity International license or own the switching system?*

This is an important decision that requires further analysis with regard to costing, maintenance and upgrades. The company also needs to review whether the system can or should be acquired globally, or on a country-by-country basis. A business case should then be developed for evaluation by senior regional and bank management and other decision-makers.

4. *What are the legal/regulatory concerns if Opportunity banks install a switch?*

⁴³ For sources about learning histories as a knowledge management tool, see <http://www.learninghistories.net/literature.htm>. Chapter 1 of the “Field manual for a learning historian” by Art Kleiner and George Roth provides a useful summary: <http://ccs.mit.edu/lh/intro.html>.

In Malawi and probably most countries, there are none with respect to installing an ATM/POS driver, since many banks have their own systems and this is an internal business decision. Installation of a network switch will need to be investigated on a country-by-country basis. It is probable that the Central Bank in Malawi will be favorable, as they have indicated unhappiness with the performance of Malswitch. It is important to take a proactive role in relationship-building with regulators to make the case for enabling, proportionate regulation. On the technical side, installation of a network switch will require certification to ensure that security and other standards are met, but this should not prove difficult per Nationlink's technical staff.

5. *What are Opportunity's positioning priorities for the Africa region with respect to a switching system?*

The first priority is to run Opportunity's own ATMs and POS devices and make sure they work reliably to serve our customers. Second priority is to establish interoperability with other in-country banks for greater outreach and transactions revenues, and third, to connect globally for remittance capability.

6. *Would it be better to start with just an ATM/POS driver or get both ATM and network switches at once?*

For Malawi and Ghana, it would probably be best to get both switches at once, since the capacity to connect to other banks is important in both markets and their current national switches are unsatisfactory for reasons of price and performance. Entry strategy would need to be reviewed for other countries, based on local conditions such as existing switching options, cost, government regulation and competitive landscape.

7. *What is the advantage of having one's own switch?*

The bank reduces reliance on monopolistic, third-party vendors in an uncertain environment and gains greater control of its own destiny (with respect to operations, service quality, suppliers and cost) with its own switch.

8. *Would it be better to host the switch in-country or to have a global switch located at the MIS Center in Denver?*

While at first glance it might seem advantageous for control and backup purposes and more efficient to have a global switch in Denver with connections to each country, there may be both legal/regulatory and operational considerations that necessitate local solutions. Some governments may require that the system and database remain in-country, for example. On the operational side, a telecommunications outage between Denver and a country bank would disable that bank's entire ATM/POS system, presenting high operational risk and impact. Although telecom failures can – and do – happen in Africa, service disruptions would not necessarily disable the entire system, but could more likely be localized and limited in impact to just one or a few ATMs.

9. *How would Opportunity International mitigate risk of disaster if the switches are located in-country?*

While it might not be possible to back up the network switch, Denver could easily back up the ATM/POS drivers. Denver can build in disaster recovery via a VSAT link direct to each of the ATM switches, supported by a server already on-hand which can run fifty percent of all the African banks. Since most transactions are “on us,” a link to InfoLite (the Nationlink ATM/POS switch) would be adequate. In the event of disaster, a bank’s greatest concern is keeping its **own** business going, so it is fine if only the ATM switch is backed up in this case.

10. *Does the switch allow a bank to view the real-time balance of agents?*

Yes, the switch settles agent transactions in real-time and the bank can monitor their floats. The agent must keep a minimum deposit in a designated settlement bank. When a customer makes a deposit (giving money to the agent which gets electronically credited to the customer’s account via POS), that amount is withdrawn from the agent’s account. Conversely, when the agent pays out a customer withdrawal, that amount is deposited to the agent’s account. This monitoring feature could be a helpful tool to support agent liquidity management.

11. *What technical steps are needed to implement Nationlink?*

- a. Develop interface with the Opportunity core banking system (eMerge) for ATM and network switches.
- b. Develop and certify interface with other national/network switches. The switch-to-switch interface is normally not difficult, since based on international standards.
- c. Ensure that InfoLite works with existing bank ATM and POS devices. This is an internal process, so does not require certification.

12. *What is Opportunity International’s value proposition to other financial institutions if it implements a network switch?*

The value proposition to other banks in countries without a national switch would be an affordable payments solution where none currently exists, whereas to banks in countries with a poorly-functioning switch it would be reliability and functionality at reasonable cost. Opportunity International could also offer solutions, including supplying co-branded cards, to NGOs that need support in collecting savings and handling loan disbursements and collections.

13. *Specific to OIBM, what might happen if the bank pulled out of Malswitch?*

There are several possibilities. One is that Malswitch would go under, since OIBM provides 60% of its business. Another is that Malswitch might consider partnering with OIBM and adopting Nationlink, since Malswitch has been hamstrung by its technology provider. If Malswitch continues on its current basis, OIBM could still use the Nationlink switch to port into Malswitch, thus maintaining connection to the other participating banks. OIBM could also offer networking solutions to other banks, MFIs and NGOs, similar to the model

employed by Nationlink in the Philippines, thereby further extending rural outreach.

9. General Consensus and Next Steps

The general consensus arising out of the Manila meetings was that Nationlink had the potential to meet the technology and business goals listed in Section 3. The Nationlink technology has the requisite interoperability, biometric capacity and lower-cost features. If the system became an Africa-wide solution, it would provide the standardization needed for regional/global support, as well as ensure interoperability among all of Opportunity International's banks on the continent. It would also give Opportunity International banks greater control of their own destiny and allow them to take a leading role in bringing other poverty-focused institutions into the network, thereby reaching greater numbers of the poor.

The deliberations concluded with a plan for next steps and an August meeting scheduled with Opportunity International and Nationlink leadership in Malawi to gather the next level of information, including acquiring technical detail, assessing project viability and building a business case. The project plan, assuming initial implementation in Malawi, is as follows:

Next Steps:

1. Document Present Set-up for eMerge and Malswitch
 - a. Detailed document (for both systems, as accurate as possible)
 - b. Develop prototype (get configuration and load up kit in the Philippines)
2. Implementation Strategy => output is PLAN (e.g., Gantt chart)
 - a. Technology (phase-in)
 - b. Installation
 - c. Deployment (interface with existing systems and machines)
 - i. Data center
 - ii. Sites
3. Business Model => develop business and pricing strategies

The time required for steps one to two is about three months and from steps two through three about two months, although some processes can run concurrently.

Opportunity International will update this document with the learnings acquired during planning and implementation for issues specific to the switching system, as well as issues that may arise on a country-by-country basis. The objective is to develop a replicable model for back-end switching solutions that can be used throughout Africa, refined by

lessons learned from on-the-ground experience. The partnership between Opportunity International and Nationlink may provide a key back-end technology enabler towards the goal of sustainable rural outreach.



Chapter Five

Developing a Cost Benefit Analysis Tool: The Experience in Malawi and Mozambique

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1. Overview

In 2006 Opportunity International was grappling with the question of how its microfinance model varied in terms of cost, income, outreach and transformational impact among the urban, peri-urban and rural communities where it operates. If, for instance, \$1,000,000 were invested in an urban branch as opposed to a peri-urban satellite centre or a rural-focused mobile van, what would the implication be in terms of Opportunity International's mission to serve the poorest of the economically active and to reach out into rural areas?

The desire for reliable metrics to answer such questions led Opportunity International to create a cost benefit analysis tool to assess the delivery of financial service to rural clients. The initial work was conducted at Opportunity International's microfinance banks in Malawi and Mozambique. These were good starting points due to their geographic proximity to one another, the maturity of Opportunity's businesses there and the nature of those two banks, which served a good cross-section of rural and urban clients. The initial assignment took place in November 2006 and a follow-up visit was made six months later to update the figures and refine the tool.

Opportunity International started from the position that this was not simply an academic exercise, but that the tool created should add value to the banks using it and provide valuable information to inform future business decisions. The banks were already doing a certain amount of work in this direction, but the cost benefit study should take this to a new level.

The decision was taken not to include an impact assessment element to measure the 'benefit' or transformational side of the equation with this tool. For purposes of workability for a tool of this nature, 'benefit' would be assessed purely in financial and outreach terms.

2. Methodology

Initially the development team looked at information that was readily available in the banks in order to create a tool that would not prove too onerous to maintain in the future. Each distribution channel had already been set up as its own cost centre, which made it easy to break down the data that far. While the decision was taken to input data per individual delivery channel, the outputs were grouped by each generic type of delivery channel. Thus, all satellite centres are looked at together and all rural branches are likewise grouped. The data is there within the tool to analyse per individual channel, but this level of detail was beyond the objectives of the initial project.

Secondly, the team looked at both financial ratios that would inform decisions and non-accounting data, such as number of staff and number of transactions, which would expand the scope of the analysis. These ratios are provided in Section 4 of this paper. The analysis required fourteen financial inputs, to which five pieces of portfolio data were added [please see Addendum 1]. Two other crucial inputs were also included, namely number of client transactions processed per delivery channel, and the number of staff employed at each outlet.

The initial tool was created in a collection of linked spreadsheets. The outputs are clear, but the input side of the first version would be complicated for a new user. From the outset the goal was to create a tool that would subsequently be upgraded to make it easier for the banks themselves to use and maintain without external assistance.

The team working on the initial version of the tool realised that a glossary of terms would add value. They therefore produced a guide that had geographic and demographic information as well as business strategy and business models. They also added brief descriptions of the locations the banks served, and similar brief sketches of the products offered. A country map was also included. This fifteen-page booklet was designed more for 'out of country' people such as regional and international management than for local bank staff. The guide has been well-received by analysts who found it useful for general quick reference.

3. Challenges in Developing the Cost Benefit Tool

The development team faced a number of challenges in creating the cost benefit analysis tool. Many of these challenges - such as data availability and cost allocation - will be common to other organizations interested in developing a similar tool. Often there was no clear-cut basis on which to make decisions, so the team had to use experience and best judgement to resolve these issues. As already indicated, plans are underway to improve both data-gathering methodology and tool structure. Some of the most significant challenges experienced in the initial development are outlined below.

1. Urban versus Rural Designation. It was difficult to split distribution channels down further into urban and rural subsets. Therefore each type of channel had to be assessed as either urban, rural or peri-urban, based on its predominant geographic outreach. Additionally, the development team observed that both urban and rural clients may visit the same outlet, making each designation a judgement call based on the best understanding of typical client characteristics. The team decided that, while some of the outlets were situated in what at first sight were urban locations, the lending business primarily took place away from the branches in more rural locations. Also the urban core of these communities was generally small, with many clients travelling regularly from rural areas into the town centre to trade. These observations led to the decision to designate certain seemingly urban channels as rural, based on their predominantly rural clientele.

2. Transfer Pricing. Opportunity International has not yet established a consistent way of

transfer pricing in its banks. Transfer pricing is an internal mechanism which, in effect, shows the credit business 'buying' the balances from the deposit-taking business. On a consolidated account these figures cancel each other out, but outlet by outlet they allow financial recognition to be given to an outlet with a strong deposit base. To a degree this is an arbitrary figure, so if one believed that the deposit gathering business was deeply transformational this would be recognised by weighting the transfer price accordingly. There is a maxim in microfinance that rural savers finance urban borrowers. Without debating this fully here, ignoring a transfer price fails to reward the successful deposit-taking outlet that incurs the high cost of gathering deposits without reaping a compensatory return on its credit portfolio.

3. Interlinked Channels. Looking at the delivery channels by generic type ignores the fact that, by definition, a satellite branch needs a hub branch to be remote from, and a mobile van needs a base branch to be attached to. In other words, none of the channels work in isolation, but are interlinked with one another in terms of support provided and resources shared, which muddies individual channel data a little. It is therefore not possible to draw sweeping conclusions from the tool, but the information provided is still invaluable.

4. Allocation of Staff and Management Costs. At first sight the smaller outlets such as kiosks and satellite branches appear to be very successful in many regards. Part of this is because they have only a few relatively low paid employees, and staff regularly form the major expense of any outlet, contributing perhaps 80% of the cost. Head Office costs have been allocated on the basis of the number of regular staff in each outlet. Whilst Head Office costs are significant, the supervisory costs from a main branch to a satellite can also be appreciable but these have not been built in at this stage.

Purely based on personal observation the development team felt that the more innovative channels such as mobile vans were of particular interest to Senior Management. As a consequence, both from an interest perspective and from the need for greater management involvement, these new channels consumed more management and supervisory time than a kiosk, for example. This weighting has not been reflected and would be very hard to quantify. It should however be noted that innovative channels may have higher management costs than the model currently is able to account for.

5. MIS Configuration for Data Retrieval. The banks' MIS had not always been configured to provide the information required easily. One example of this is the number of client transactions per delivery channel, which had a large manual element to the gathering. Opportunity International views the number of transactions as a key supplement to the outreach figures and of huge value when comparing the different behaviours of rural and urban clients. Extrapolating this on to cost per transaction and transactions processed per member of staff vastly deepens insight into outreach and consumer behaviour and needs.

6. Allocation of Start-up Costs. The initial version of the tool omitted the total investment made from the outset of each outlet and the source of the funds. In the next

revision of the tool, the source of funding and initial investment will be included in the narrative report, while the total investment will be added to the financial information. Donor information will need to be treated with discretion, as some donors prefer to remain anonymous and such wishes must be respected.

7. Mobile Van Flexibility. The freedom of the mobile units to stop at different locations, alter routes and change the days of visits makes them hard to analyse. Their huge benefit is total flexibility, but ironically this poses a challenge when assessing their performance. Opportunity International Bank of Malawi operates more than one style of van and this further complicates the issue. Arguably these vans could be considered as different types of delivery channels, but presently they are treated in the cost benefit tool as one kind of channel.

8. Accounting for Different Product Ranges. Whilst it is not the case at the moment, there could potentially be different product ranges in certain branches. Opportunity International will shortly face this issue as it moves further into education and agricultural lending. The cost benefit tool does not, in its present iteration, break down income by product. As Opportunity's businesses grow in complexity, it will need to weigh the benefits of the current version of the tool, which is relatively straightforward to complete, versus the cost of more complicated data input in order to gain additional benefits from showing products individually.

4. Key Ratios and Indicators Produced

The cost benefit tool was devised to produce twelve financial ratios and key indicators. These were deemed to be among the most important figures for evaluating channel profitability and productivity, which could provide essential information for making business decisions such as future investment allocations. A notable benefit from the tool is providing objective metrics for comparability between different delivery channels. The tool's financial outputs are listed below:

- Net Income
- Cumulative net income
- Profitability
- Cumulative profitability
- Return on assets
- Return on capital employed
- Net income per active client
- Net income per transaction
- Net income per staff member
- Operating cost per active client
- Operating cost per transaction
- Operating cost per staff member

5. Examples of Charts Produced

In addition to providing financial ratios and other indicators, the tool was also structured to produce charts to examine trends and compare delivery channels. The charts were drawn both by calendar month and by month of operation. Historic data was not always available for the second category, resulting in gaps in some of the charts at present.

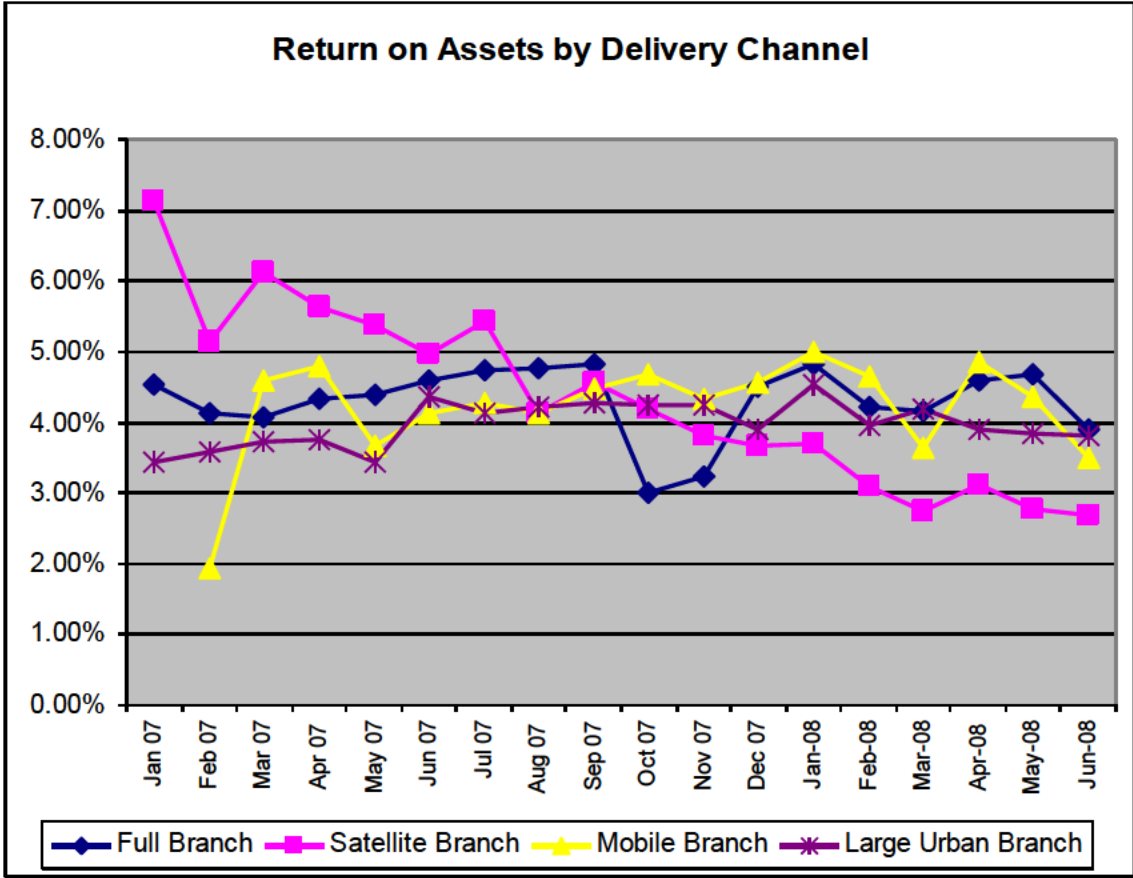
Calendar month shows seasonality but fails to recognise the maturity of any given delivery channel. With an extensive multi-outlet organisation this effect might be hidden, but with the initial two countries of Mozambique and Malawi, which had perhaps ten delivery channels, the effect was potentially significant.

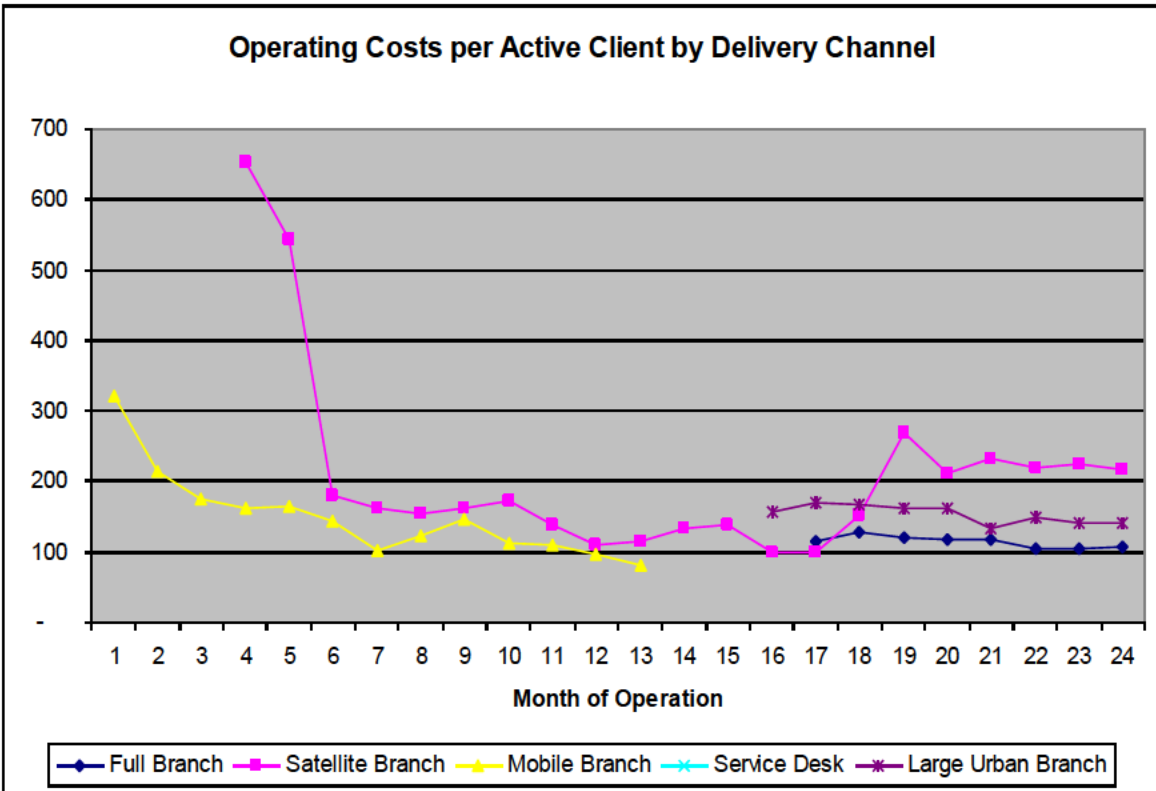
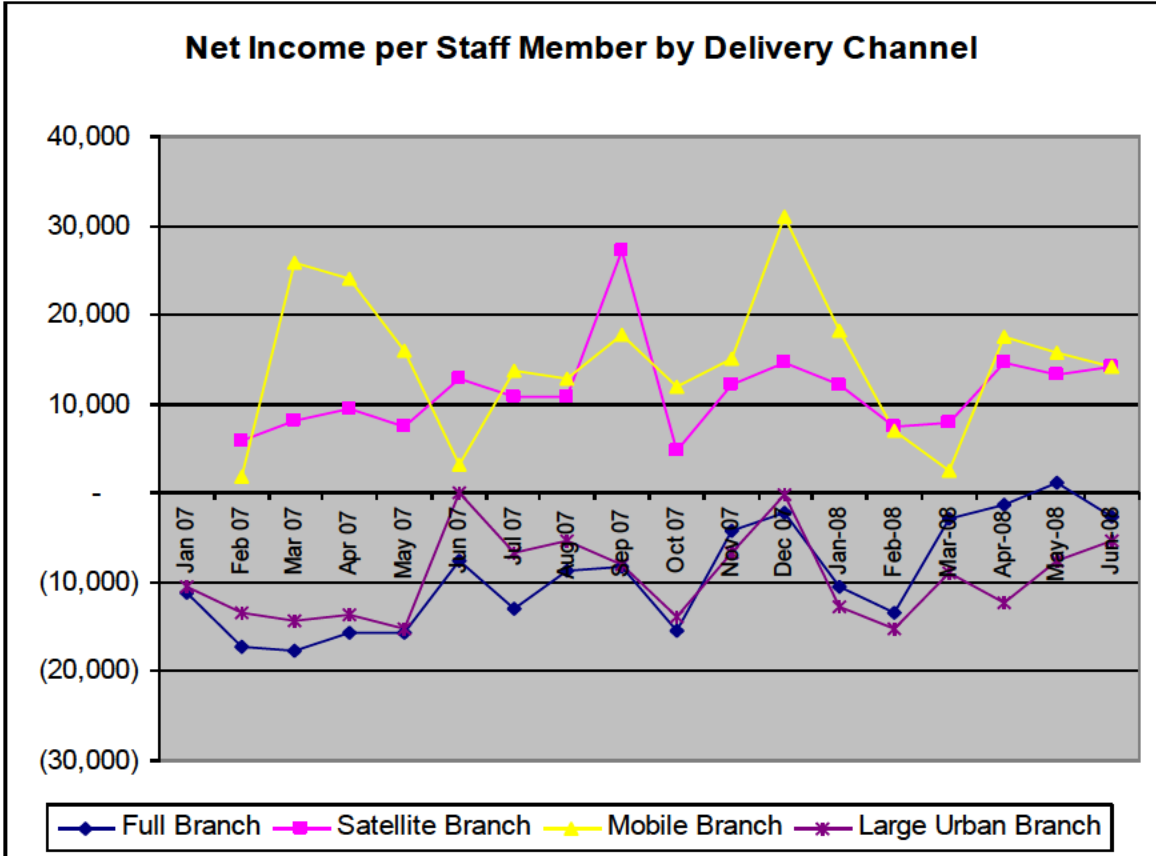
The charts showing trends by months of operation revealed some interesting patterns. However, exceptional peaks and trough in the early months while business is settling down were distorting the scales on the charts by showing very high / low values in the early months, which masked smaller, more normal movements in later months as trends evened out. The team also noticed that trends seemed to be established at about twenty-four months. They therefore decided to restrict these charts to the third until twenty-fourth months of operation.

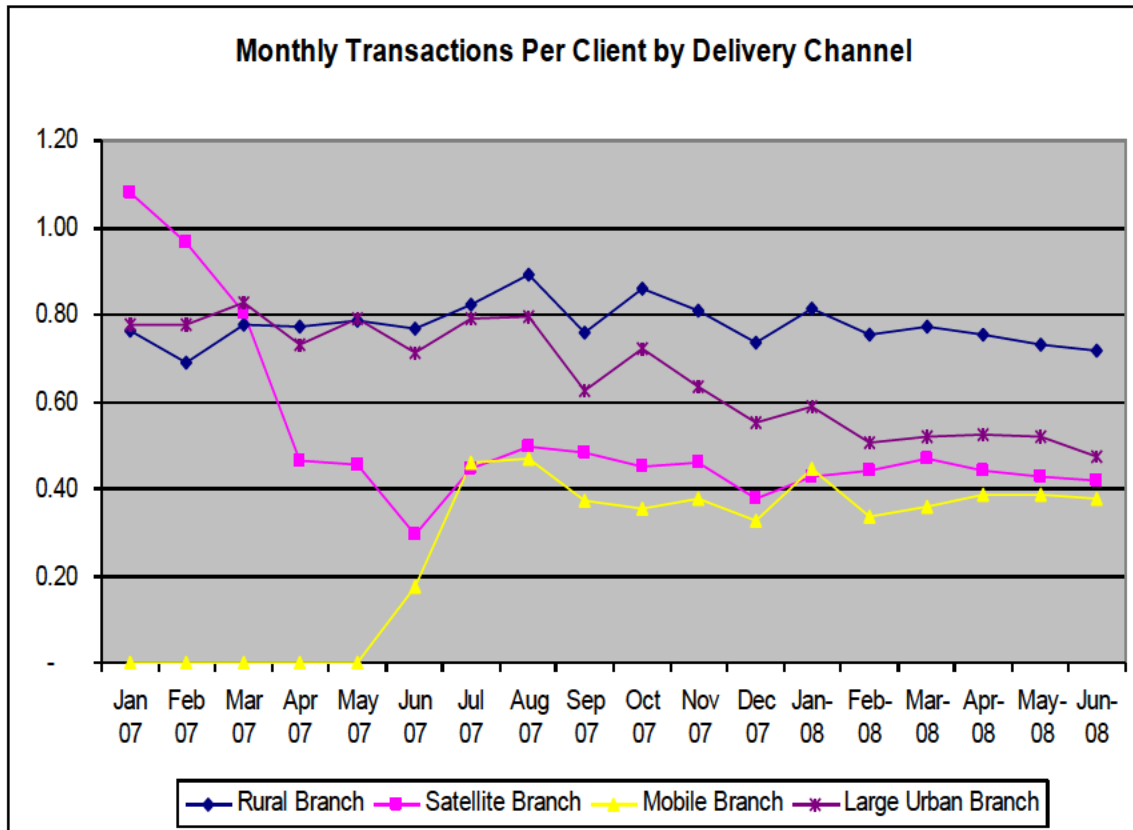
A further group of charts were produced in various formats to track other interesting trends.

The ability to have a free-format section where banks can delve into particular areas of interest will be essential for future upgraded versions of the tool.

The four charts shown below are just a few examples of the charts that the present version of the cost benefit tool can create.







6. Preliminary Observations from Analysis Results

The cost benefit tool is still being refined with respect to its structure and to data gathering. Nonetheless, the early results already provide some fruitful information for management consideration. As can be seen from the chart drawn on a month of operation basis above (“Operating Costs per Active Client by Delivery Channel”), when this particular bank was started the accounts were not split by delivery channel, and it has not been possible to work backwards to re-create the figures. In this bank the calendar month figures are therefore more useful at present.

One very interesting observation from this “Operating Costs” chart is that the full branches, large urban branch and mobile branch are converging in their performance on operating cost ratios, while the satellite branch appears to be relatively less cost-efficient. In this particular case the satellite branch is only one office at present (while there are three rural branches) and so there may be local issues affecting the outcome. On the other hand it may indicate that management needs to look more closely at the organisational structure at the satellite branch.

Separate findings show that return on capital is lowest on the more substantial branch buildings as opposed to the cheaper satellite structure. Perhaps most surprisingly, the return on capital on the mobile unit is the highest of all. This may be because the unit visits various communities during the week and therefore each opening time is an *event* in that community. It therefore suffers less than fixed branches from lulls in business.

The initial observations from the tool can inform Opportunity International's strategic thinking on how its banks can develop a large number of small scale units, supported by a larger hub branch, to achieve outreach. This appears to be an efficient way to expand.

When looking at the data by calendar month, one needs to remember that within each outlet type there may be a mature outlet and a brand new one. As performance in the early months can be irregular this can distort results. By looking at the charts by 'month of operation' any anomalies can be identified.

7. Key Learning Points

1. From the very start of operations ensure that all delivery channels are established as separate cost centres from when the first expense is incurred.
2. Ensure that the MIS is set up from the start to deliver all the information that management will require in easily accessible formats.
3. Decide on an approach to transfer pricing and build it into management accounting early in operations.
4. Be aware of the amount (and hence cost) of management time in any project and in the supervision of remote delivery channels. Decide on how this can be accurately quantified.

8. Next Steps

Opportunity International is currently looking at a number of upgrades that will improve the value the tool delivers to its banks.

1. User-Friendly Design Improvements. The tool's initial design will be referred to an IT specialist who will adapt it to make it easier to update and enhance the ability of users to add additional analysis of areas they are especially concerned with. Much of the workings of the current tool can be hidden behind the scenes to look less daunting and be more user-friendly.
2. MIS Data Capture. The development team is actively discussing the production of certain reports with Opportunity International's MIS experts so that valuable data is in future captured by the computer and easily accessible in a convenient format.
3. Stakeholder Input. All stakeholders are being consulted at each stage to ensure that the next version meets as many needs as possible.
4. Knowledge Sharing. Opportunity International is committed to sharing the lessons learned from this worthwhile and challenging undertaking so that the wider microfinance community may understand the issues involved in creating such a tool and benefit from its application.

Addendum 1

Data input into the cost benefit tool.

Financial Income
Head Office expenses
Interest on Loans
Charges and Fees - Loans
Charges on Accounts
Income on Deposits & Investments
Total Financial Income
<i>(Less Interest Expense)</i>
<i>(Less Provision for Bad & Doubtful Debts)</i>
Net Financial Margin
Other Income
Total Income
Operating Expenses
Personnel Expenses
Administrative Expenses
Depreciation Expense
HQ Expense Allocation (By # Staff Members)
Total Expenses
Total Net Gain / Loss
Other Indicators
Total Assets
Current Liabilities
Total Staff
Loan Clients - All Loans
Loan Portfolio -All Loans
Number of Savers
Amount of Client Deposits
Total # of Clients
Total # Client Transactions