
Building a Better Magic Bullet

Information Technology Effectiveness in Microfinance

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ABSTRACT

Microfinance has supplanted a legacy of unsustainable development models as a tool for enabling the world's poor to help themselves. The market for microcredit is still vastly underserved, and new profit-motivated entrants bring competitive advantages in the form of information technology infrastructure. Meanwhile, mobile technology adoption by developing markets continues to transform the way business is conducted across the globe. The interaction of information technology with microfinance models has resulted in new partnerships, sources of funding, and methods for client support. Despite a multitude of prior research on microfinance institution (MFI) performance, relatively few studies have examined the application of information technology as a factor in their success. This study categorizes IT usage into six applications and considers their connection to three performance metrics for the ten largest sub-Saharan African MFIs by gross loan portfolio. It concludes that no connection can be determined to exist between the application of technology by these MFIs and their performance. A broader set of data, particularly focusing on mobile phone integration, is needed to conduct further study in this area.

INTRODUCTION

FAILED DEVELOPMENT MODELS

Images of unthinkable poverty have appeared on the developed world's television screens for years. These images are, in many ways, an indictment of the policies for which they sought to garner support. Consider a standing United States policy for many decades: subsidize the crops of American farmers, some of the most productive in the world; generate a substantial surplus; then 'dump' that surplus on developing world markets for free or at prices far below market value. As long as that surplus was maintained, people the world over had access to cheap food. But during lean years and especially after the advent of corn-based ethanol fuel, the cheap US surplus disappeared and depleted local industry in the developing world was unable to meet demand. Famine was the inevitable result (Moyo 2009).

Even more targeted development efforts exhibited a similar cycle of boom and bust. Private citizens and national governments contributed money to poverty and disease eradication problems during economically secure years. These programs produced goods and services at prices far below the competitive range of local providers. When economic cycles inevitably forced budget cutbacks in the giving policies of individuals and governments, development programs were unable to maintain service levels (Waylaid 2010). Cutbacks left health, education and agricultural sectors unable to meet local demand.

The end result of the charitable model of development was a series of catastrophic troughs in food, medicine, and services available to citizens of the developing world. A disturbing subtext to this model was the notion that poor countries were simply unable to achieve economic growth on their own (Moyo 2009). Tragically, policies intended as philanthropic efforts to stimulate economies and aid citizens actually stifled growth in many parts of the developing world and killed millions.

WHAT IS MICROFINANCE?

In 1973, ACCION International began offering financial services to extremely low-income Venezuelans in the form of micro-loans. Grameen Bank's famous group lending model began in India a few years later, in 1976. Thirty years and one Nobel Prize later, microfinance is an established tool for "grassroots" global development. Most explanations of the microfinance model will include the expression "teach a man to fish." The notion of enabling the world's poorest to lift themselves out of poverty provides a welcome alternative to decades of failed top-down attempts. This self-empowerment concept is perhaps the most appealing aspect of the microlending methodology.

In all models, the microfinance institution (MFI) approves an amount of credit far below the amount that a typical commercial bank would consider. While the loans are expensive (many carry interest rates well over 30%), they provide more efficient access to capital than the informal local consortiums and loan sharks

that comprise the other lender to the world's poor. This capital is typically lent for an entrepreneurial enterprise, and many MFIs provide auxiliary services to aid in the success of the borrower's firm (Goldmark 2006). In the absence of credit ratings and collateral, lenders will often enlist the social dynamics of a group to enforce loan. In the famous group lending model pioneered by Grameen, women meet weekly at the MFI headquarters to make their deposits and take turns holding the group's capital. As the capital is recouped with substantial interest reflecting the risk of the investment, it becomes available to future entrepreneurs. Such investment in local economies is intended to benefit the loan recipient as well as their community.

Repayment of the loan is the crucial step in the microfinance cycle. Without collateral or credit history to incentivize repayment, the only guarantees are the relationships between the lending agency and the borrowers. Over the years, repayment rates have steadily risen as lending models have been carefully refined (Economist 2005). Auxiliary resources provided to borrowers often include financial literacy training, business-building resources, and access to a community of entrepreneurial borrowers in the area. Educational resources especially can eventually have greater lasting impact on the community than the cycle of microloans. However, even these additional services are not sometimes not enough: repayment rates in Andhra Pradesh, location of one third of the Indian microfinance market and a bastion of consumer education, fell to 20% after a string of borrower suicides led the government to intervene (Mortara 2011).

GROWTH OF MICROFINANCE

Despite decades of practice and substantial research, the long-term impact of microfinance remains unclear. Unlike other development organizations, microfinance institutions must straddle two objectives. Primary metrics for success at most MFIs are framed in terms of social justice and poverty reduction, but institutions must also remain solvent in order to function as a lender.

Two primary schools of microfinance have emerged since the Nobel Prize was awarded to Muhammad Yunus and his Grameen Bank in 2006. Grameen's nonprofit model granted loans to rural entrepreneur groups across India. At the same time, ACCION and other Latin American microfinance institutions (MFIs) pioneered an urban, small-business-focused model typically featuring loans of greater magnitude. According to the Microfinance Information Exchange, the average Latin American microloan today is about \$1,000 while African and Indian loans hover around \$350. This divergence was a natural consequence of differing markets and, initially, both models were praised as templates for socially conscious, sustainable business initiatives that could eliminate poverty where government programs had failed.

GROWING ACCESS TO TECHNOLOGY

Meanwhile, the developing world has been undergoing a revolution in communications technology. Over the space of the last decade, wireless networks grew to cover 80% of the world by population. Half of the people in the world own a

cell phone – far more than have access to a toilet with plumbing. In the developed world, networked communications technology has revolutionized everything from corporations' supply chain structures to individuals' access to film. It is not unreasonable to anticipate a similar revolution in the developing world, not least because it is already underway.

In sub-Saharan Africa, the region with the lowest internet usage across the globe, a mobile banking technology called MPESA is reinventing currency (Panchasara 2011). Information technology has already improved the efficiency of global financial markets. Computer-driven algorithms account for the majority of trades in world exchanges, while end consumers have unprecedented transparency in accessing financial information. Similar transparency has allowed agricultural businesses in the developing world to plan crops according to market prices using the mobile phone. The judicious application of information and communications technology could have tremendous potential to both expand the reach and improve the efficiency of microfinance efforts.

SUSTAINABILITY

The microfinance model holds one major advantage over other development initiatives. It is a sustainable effort, capable of continuing to operate with its own revenue indefinitely. The pernicious effects of boom-and-bust fluctuations in poverty and disease eradication efforts are eliminated, so long as MFIs can sustain themselves. ACCION and Grameen have existed for nearly forty years and show no signs of financial weakness. But most data on microfinance is susceptible to “survivorship bias”: reported data, by definition, comes from solvent MFIs that still exist because they made sound and well-supported loans (Economist 2005). The unknown percentage of dead MFIs can never be taken into account in the microfinance literature.

With these bankruptcy risks in mind, the danger of a deadly boom-and-bust cycle begins to look just as possible in microfinance as in top-down development models. It is therefore critical for microfinance to maintain its sustainability in all economic conditions. Firms in a microfinance market already oversaturated with nonprofit MFIs, now in competition with profit-seeking SHFs, must not overland in an attempt to maintain solvency. Otherwise, a tragic chain of events like the ones in Andhra Pradesh can rapidly bring the entire industry to its knees. In 2011 Muhammed Yunus was accused of ‘sucking blood from the poor’ due to problems at his bank.

FOR-PROFIT MICROFINANCE

Shareholder firms (SHFs) have responded to the widespread success of microfinance by incorporating as for-profit institutions. Instead of recapitalizing with the entirety of loan repayments, these firms return a portion as profit to the institutions which financed them in the first place. An ACCION fund established in this manner produced steady 6% returns in conditions of economic turmoil and unfavorable exchange rate fluctuations, according to a special report in *The Economist*.

Despite concern that the social mission of microfinance could be lost in a profit-motivated model, studies have shown equal effectiveness between SHFs and non-profit organizations (NPOs) (Tchakoute-Tchuigoua 2010). Development of the for-profit model has continued as global brands like Citigroup, Deutsche Bank, Commerzbank, HSBC, ING and ABN Amro begin experimenting with microfinance operations. A competitively priced micro-loan, from either a SHF or NPO, contains within it the seed of social benefit through community investment regardless of the lender's motivation (Mersland 2009).

Citigroup and other new entrants of similar market capitalization bring a technological infrastructure unprecedented in the microfinance market. The rigor of global capital markets has imbued such global banks with the expertise and equipment to effectively analyze global market trends and quantify risk in a way that NPOs could never hope to match. From effectively straddling the vicissitudes of international exchange rates, to analyzing creditworthiness based on algorithmic analysis of past data, to tools assisting ground-level staff in doing their jobs, these

banks have the advantage. Furthermore, their competition with each other and with NPOs increases the value provided to the borrower (McIntosh 2004).

FULL CIRCLE IN BANKING TO THE POOR

Despite the advantages of sustainability and grassroots empowerment, microfinance is far from a cure for poverty. Recent market entrants seeking growth and established MFIs with ambitious outreach goals have saturated the low-income market for loans, resulting in gradually loosening lending standards. The target market for these loans, poor entrepreneurs in developing economies, have a severely constrained capacity to absorb debt. Disastrous results of an overheated microfinance market included a string of suicides in northern India in 2005. In sub-Saharan Africa, symptoms of an overheated markets for microcredit included clients simultaneously indebted to multiple MFIs and decreased repayment rates (Viada and Gaul 2012).

Moreover, the profit incentives of SHFs raise grave concerns for the future of microfinance over the long term. The size and technological sophistication of a global bank's MFI entry could conceivably achieve monopolistic market share. Eliminating NPOs from competition in the marketplace can only harm the borrower and reduce microfinance's impact as a tool for development (Morduch n.d.).

Already, signs of conscience-free microfinance have begun show. The initial public offering of a Mexican SHF was widely anticipated until it was revealed that the firm levied interest rates of 94% on its poverty-stricken borrowers (D.-K. M. Cull

2009). Muhammad Yunus himself predicted a “backlash” and denounced the entire for-profit model of microfinance. A chasm is widening between the Latin, African, and Indian models.

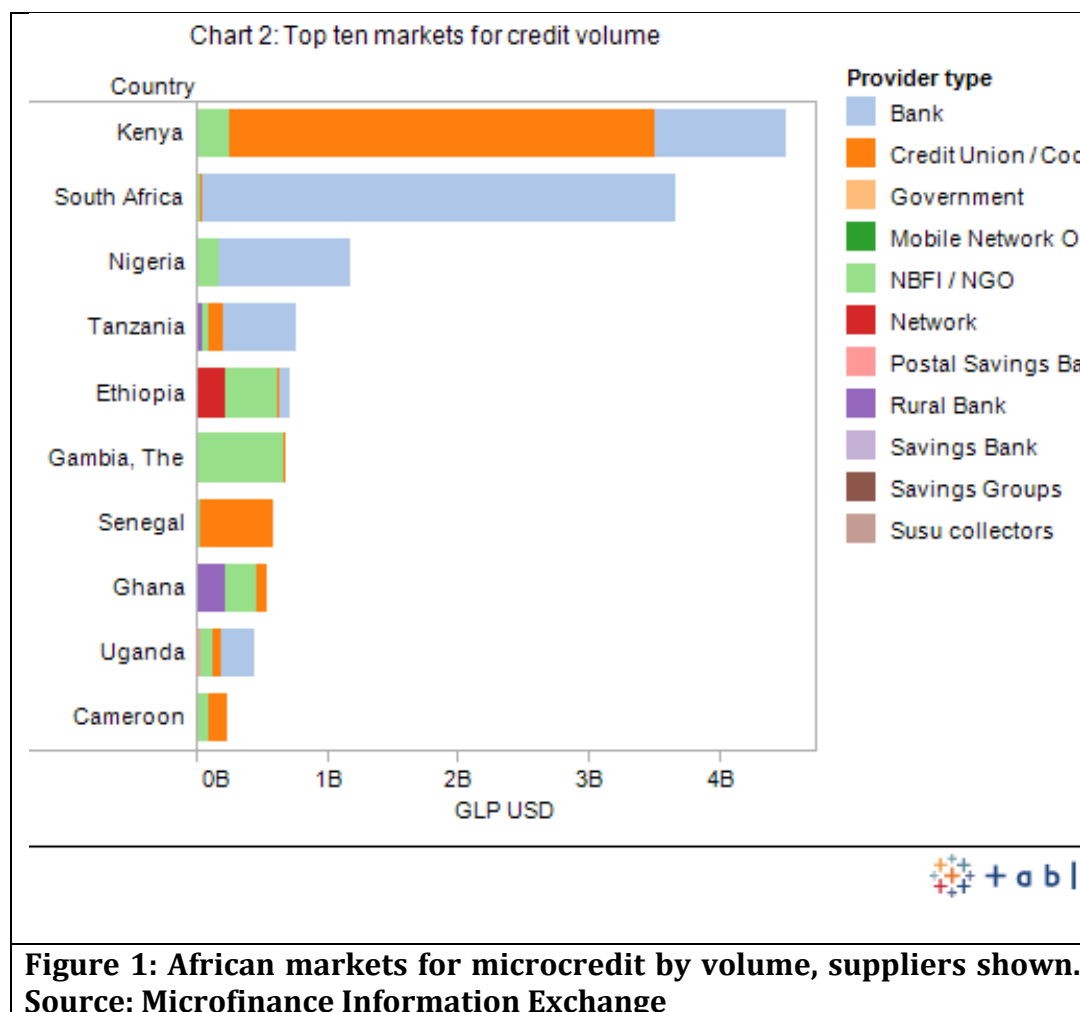
Global finance firms are invading microfinance as the non-profit sector fractures. Muhammad Yunus has been forced out of the Grameen Bank, SHFs across the world are raising interest rates, and a global recession has kept other development initiatives throttled to an all-time low. The mission of microfinance across the globe is drifting from social equality to profit maximization. In order for the world’s poorest to continue to have access to affordable financial services and auxiliary assistance, non-profit microfinance must continue to compete in the marketplace as a viable model.

Without a strong NPO presence in micro-loan markets, the industry will have come full circle. The loan shark operations that were undercut by MFIs will have returned in the form of profit-maximizing SHFs. Lacking the incentive to provide auxiliary services to lenders at the expense of profit, for-profit firms cannot fulfill the poverty-eradicating mission of microfinance as effectively as a combination of SHFs and NPOs.

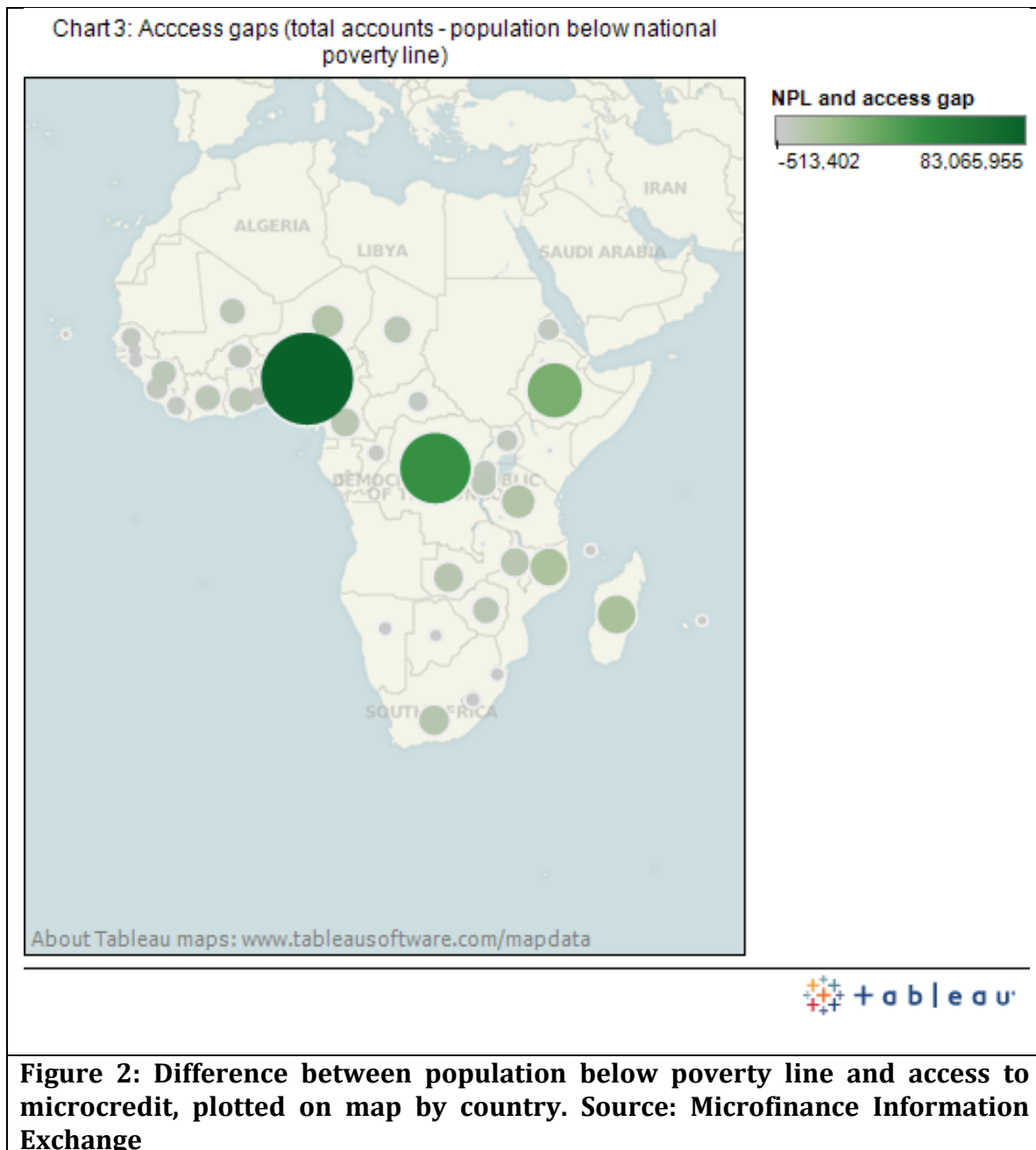
The benefits that global SHFs derive from their technological infrastructure may present a solution. Regional and worldwide financial analysis, extensive capability for testing and improvement, and enhanced outreach all progress from capital-intensive investment in technology infrastructure and expertise (Navajas 2003). If a consortium of NPOs were to have access to the same quality IT

infrastructure, the resulting level playing field could extend competition in the microfinance marketplace far into the future.

Despite these symptoms, the African market still presents a tremendous appetite for credit. Last year 23,000 MFIs served 71 million clients with 44 million deposit accounts, 20 million loans. Kenya and South Africa are the largest markets by far, followed distantly by east and central African economies (Fig 1). In 2002, PRIDE Africa extrapolated the global demand for microcredit at 300 billion. The total amount of microcredit available was 7 billion (Campaigne 2002). In sub-Saharan Africa, the situation has not changed dramatically: many nations observe a large gap today between populations living in poverty and populations with access to financial services.



In Nigeria, the population below the poverty line exceeds that with access to microcredit by 80 million. Other nations, including Congo and Tanzania, present a similar gap (Fig. 2)



AREA OF STUDY

In sub-Saharan Africa, the competitive environment between SHFs and MFIs is less antagonistic. Hovering above \$360, median loan amounts remain far lower than the average \$1000 per borrower in Latin America. As a result, regional or

national banks are content to provide institutional loans to support the MFIs that actually write the checks (MIX Report, 2011). These financial partnerships between NGOs and banks present a model for the future profitability of microfinance: PRIDE Africa, a leader in East African microfinance, has introduced a collectivized microloan financial instrument for sale to commercial banks (Hammond 2001). A stable MFI could conceivably make a profit on both sides of its business, enabling lower lending rates, faster portfolio growth, or both.

In order to effectively package and sell portfolios of microcredit risk, the MFI must have a level of control over its data that is difficult to achieve in the rural context in which they operate. Without collateral or credit histories, risk forecasts must be generated from other data. Consistent lending policies coupled with analysis of past returns could present a solution, but crucial pieces of infrastructure must be in place before they can be implemented. Most importantly, branch locations must each have digital loan tracking systems communicating with the central MFI. Other pieces must follow.

LITERATURE REVIEW

An extensive body of research documents the rise of microfinance from a regional banking innovation to a prizewinning model for global development. Most modern studies can be divided by topic and by method (Fig. 3). Research has either focused on the operations of non-profit or SHF MFIs, or else compared the two. Studies directed at methods often failed to capture their effectiveness due to the lack of MFIs using comparable methods. These qualitative surveys are nonetheless highly applicable to studies of technological sophistication between non-profit and SHF MFIs. Quantitative surveys mainly establish parity between the two models, with some research into the allocation of consumer surplus. Finally, case studies document significant microfinance events such as technology-backed outreach initiatives, IPOs, and competitive maneuvering between MFIs serving the same market.

	NPO/COOP	SHF	Comparative
Quantitative	(Bagazonzya 2010)	(Kamdar 2008)	(Mersland 2009)(McIntosh 2004) (Tchakoute-Tchuigoua 2010)
Qualitative	(Siriginidi 2009) (Goldmark 2006) (Castello 2006) (Frederick 2008)	(De Mel 2009) (Navajas 2003)	(Eversole 2003)
Case	(Hammond 2001)	(Cull, et al. n.d.)	(Morduch n.d.)
Fig. 3: Literature Review breakdown of research by profit status and research type. Bold citations indicate an analysis of technological infrastructure was conducted in the research.			

Further research by Scott Gaul of the Microfinance Information Exchange suggests that African MFI profitability exhibits a strong break between NGOs and MFIs. As measured by Return on Assets (ROA), the nonprofit microcredit sector performed significantly better than for-profit organizations in the period from 2003 to 2010. Recently, however, the median ROA of MFIs and NGOs has converged almost to a single figure (Fig. 4). This analysis incorporates co-op and village S&L collectives under the nonprofit umbrella (Gaul, Profits by profit status 2003 - 2010 2012).

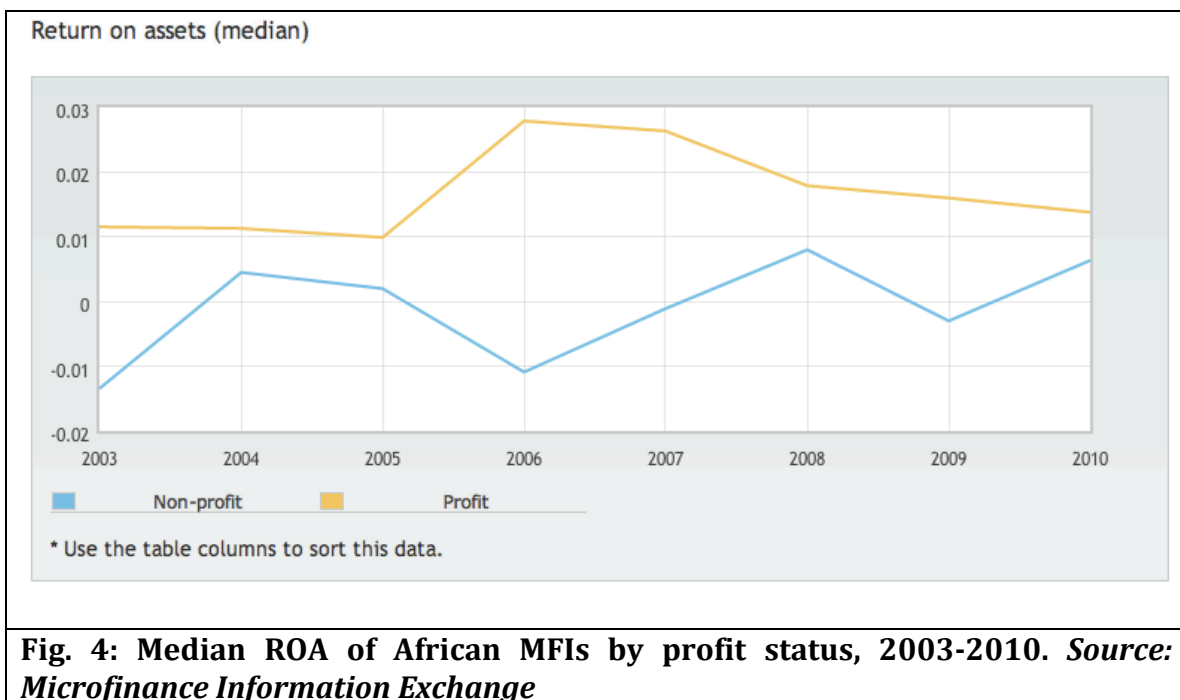


Fig. 4: Median ROA of African MFIs by profit status, 2003-2010. Source: Microfinance Information Exchange

In sub-Saharan Africa specifically, the changing profit status of many MFIs has prevented comparative analysis across profit status. Tanzanian legislation licensing MFIs to operate commercially has offered significant tax and operating incentives, yet PRIDE Africa has been wavering on the brink of such a designation for years (Campaigne 2002). In Nigeria, 224 of 900 licensed MFIs had their licenses revoked in 2010. Within months 121 reverted back to a state of provisional approval (Gaul, Mapping Nigerian Microfinance Banks 2011). Such uncertainty in profit status makes up-to-date profit comparisons difficult.

IMPORTANCE OF TECHNOLOGY INTEGRATION

The importance of NPO competitiveness with multinational SHF entrants in the microfinance market cannot be overstated. To avoid yet another boom and bust cycle in global development effort, non-profits must find a way to replicate the technological advantages of large SHFs. However, existing literature is unclear on the particular applications of technology that have resulted in the greatest bottom-line benefit to MFIs.

Especially frustrating is the lack of available quantitative data on the application of information technology infrastructure by multinational SHFs. The advantage of global perspective and the ability to find meaningful conclusions in a large body of data are as crucial in microfinance as in the global capital markets.

Absent any studies on the magnitude of this advantage, research into application of IT in microfinance cannot proceed.

Furthermore, no existing comparative studies examine both SHFs and NPOs with any regard for their information technology capabilities. Differing incentive structures and corporate organization between the models may have an impact on the applicability of certain technologies. It is possible that a comparative model may be developed using the existing body of qualitative surveys focused individually on either SHFs or NPOs. No evaluation whatsoever exists on the effectiveness of this technology, however. Communications technology is typically studied as a case, as in the MBOLA mobile banking system studies, making a systemic analysis difficult.

This study, therefore, will seek to fill gaps in the body of comparative research on technology-enabled microfinance models, specifically focusing on the effectiveness of information technology infrastructure employed by MFIs in the underserved sub-Saharan Africa market. The importance of filling this gap is paramount – without proven tools to compete with global entrants, NPOs may be forced to exit uncertain microfinance markets and relegated to providing auxiliary services like education. An all-SHF marketplace brings the industry full circle, back to the exorbitant interest rates that prevented grassroots development before the entry of MFIs. Maintaining the sustainability of microfinance will require extensive research on the ways all MFIs can leverage technology to their advantage.

METHODOLOGY

CATEGORIZATION

This study will examine the presence of six technology applications in microfinance. Their impact will be gauged based on their presence or absence, not the effectiveness of their application. The names and definitions of these categories follow.

1. **Loan Tracking** is defined as a database management system to assist loan officers. This system may include other loans a prospective client has made with other MFIs, scheduling tools for more efficient updating of loans. As the microfinance market has become more saturated, it has become sadly commonplace for borrowers to amplify their access to credit by seeking loans from multiple MFIs. This tactic was a factor in the recent string of borrower suicides in India. By tracking loans not just in an individual MFI's records, but in all MFI records, multiple lending can be eliminated virtually overnight.
2. **Data Analytics** is defined as a collection of database views that can be used to generate reports on risk, creditworthiness, and general market conditions. May include forecasting tools. These analytics are necessary for the repackaging and sale of collectivized client debt. In order to effectively price the risk of the loan package, MFIs or the firm hired to perform the valuation must have access to a complete set of information about the package. These

analytics have other purposes, too – predictive measures and benchmarking become easier when technology enables executives to see the past and current performance of the MFI in detail.

3. **Mobile Currency** is defined as banking integration with Safaricom's M-PESA or other systems. These systems enable clients to make weekly/monthly deposits without traveling to branch location. Staffing field offices becomes less of a problem for the MFI, while travelling to those field offices becomes less of a problem for the borrower. Lacking the transportation infrastructure of other regions, a client in many regions of sub-Saharan Africa can spend an entire day's travel to reach a branch office and conduct a simple financial transaction. Mobile currency solves this problem for the majority of transactions, and may even come with a suite of additional financial services offered by a partner bank.
4. **Web Outreach** is defined as either client outreach to enable faster growth and compete in a tight microfinance market, or funding outreach to raise free capital from donors around the globe. Kiva and Oikocredit are two examples of the latter function. Client outreach over the web is rarer in sub-Saharan Africa, as internet access mostly is limited to higher-income individuals. However, many banks tap global charity markets as a source of funds and consider it well worth the investment to partner with multiple donation portals.
5. **Staff Support** is defined as on-the-ground technology assistance for loan officers. An example is AIMO Credit's palm-pilot training program to sync

data across branches and enable more efficient data analytics. Any IT system is less effective if the majority of MFI staff cannot apply the advantages it provides. Mobile technologies and database connectivity at MFI branches open access to loan-tracking and data analytics systems to decrease processing time and enable quicker decision making by loan officers.

6. **Additional Financial Services** are defined as partnerships with a commercial bank or other institution to offer additional banking products. These partnerships may take the form of a kiosk in branch locations or the option to buy investment products through the local branch. In these partnerships, the MFI hopes to gain a percentage of the client's transaction with the third-party bank. The third-party bank hopes to gain access to the market of potentially middle class entrepreneurs served by the MFI.

MICROFINANCE INSTITUTIONS SURVEYED

The ten institutions selected for study are some of the most successful and data-rich in sub-Saharan Africa. They hold the ten largest gross loan portfolios with data available on ROA, profit margin and portfolio yield. Operating across the continent, they provide various levels of service and incorporate varying degrees of IT integration. These institutions were chosen because their volume affords them the luxury of piloting IT projects if they so choose. Many smaller MFIs do not have the option of doing so without receiving a grant.

Data is drawn from Sub-Saharan Africa markets, excluding South Africa, unless stated otherwise. Differences in technology adoption, per capita income, and

infrastructure development prevent relevant comparison with data derived from many South African markets. However, programs introduced in South Africa offer a compelling test case for adoption in future markets across the continent at comparable stages of development.

Sinapi Alpa Trust

- Gross Loan Portfolio USD, 2010: 19.7 million
- Number of active borrowers 2010: 102,545
- Average loan balance per borrower USD, 2010: 192.5
- Deposits USD, 2010: 6.1 million
- Assets USD, 2010: 30.7 million
- Number of depositors 2010: 102,912

Products and Services:

- Loans
- Voluntary Savings
- Insurance
- Fund Transfer Services

Technology Integration:

- Loan Tracking
- Outreach through Kiva
- Additional Financial Products through Commercial Bank Partnerships

Opportunity International Bank of Malawi (OIB)

- Gross Loan Portfolio USD, 2010: 31.3 million
- Number of active borrowers 2010: 51,152
- Average loan balance per borrower USD, 2010: 612.8
- Deposits USD, 2010: 35.1 million
- Assets USD, 2010: 61.3 million

Products and Services:

- Loans
- Voluntary Savings
- Insurance
- Funds Transfer Services
- Training and Consulting
- Fund Transfer Services

Technology Integration:

- No integration beyond loan database

Opportunity International Savings and Loans – Ghana (OIS)

- Gross Loan Portfolio USD, 2010: 16.6 million
- Number of active borrowers 2010: 41,713

- Average loan balance per borrower USD, 2010: 398.8
- Deposits USD, 2010: 15.0 million
- Assets USD, 2010: 24.2 million
- Number of depositors 2010: 182,567

Products and Services:

- Loans
- Voluntary Savings
- Insurance
- Fund Transfer Services

Technology Integration:

- Loan Tracking
- Additional Financial Products through partnership with ING Inc.

Faulu/Opportunity Uganda (UGA)

- Gross Loan Portfolio USD, 2010: 9.7 million
- Number of active borrowers 2010: 19,725
- Average loan balance per borrower USD, 2010: 490.4
- Deposits USD, 2010: 2.8 million
- Assets USD, 2010: 13.8 million
- Number of depositors 2010: 33,918

Products and Services:

- Loans
- Insurance
- Training and Consulting

Technology Integration:

- Full-Service Banking MIS by Neptune Software
- Web-sourced funding through Oikocredit

Urwego Opportunity Bank (UOB)

- Gross Loan Portfolio USD, 2010: 6.4 million
- Number of active borrowers 2010: 30,381
- Average loan balance per borrower USD, 2010: 212.0

- Deposits USD, 2010: 5.0 million
- Assets USD, 2010: 10.8 million

Products and Services:

- Loans
- Voluntary Savings
- Training and Consulting

Technology Integration:

- Web-sourced funding through Kiva

Banco Oportunidade de Mozambique

- Gross Loan Portfolio USD, 2010: 3.1 million
- Number of active borrowers 2010: 9,243
- Average loan balance per borrower USD, 2010: 336.3
- Deposits USD, 2010: 2.3 million
- Assets USD, 2010: 6.6 million

Products and Services:

- Loans
- Voluntary Savings

Technology Integration:

- Web-sourced funding through Oikocredit

PAMF-Madagascar (PAM)

- Gross Loan Portfolio USD, 2010: 3.5 million
- Number of active borrowers 2010: 15,688
- Average loan balance per borrower USD, 2010: 220.8
- Deposits USD, 2010: 3.6 million
- Assets USD, 2010: 4.5 million
- Number of depositors 2010: 8,270

Products and Services:

- Loans

Technology Integration:

- No integration beyond loan database.

Opportunity Finance South Africa (Opp-SA)

- Gross Loan Portfolio USD, 2010: 5.7 million
- Number of active borrowers 2010: 4,176
- Average loan balance per borrower USD, 2010: 1,367.1
- Deposits USD, 2010: 0.0
- Assets USD, 2010: 5.9 million

Products and Services:

- Loans

- Training and Consulting

Technology Integration:

- Loan Tracking through microfinance-specific MIS.
- Staff Support through on-the-ground mobile internet.

Opportunity Kenya (Opp-K)

- Gross Loan Portfolio USD, 2010: 3.9 million
- Number of active borrowers 2010: 7,341
- Average loan balance per borrower USD, 2010: 537.4
- Deposits USD, 2010: 1.9 million
- Assets USD, 2010: 4.9 million

Products and Services:

- Loans

Technology Integration:

- Web-sourced funding through Kiva

Opportunity Tanzania

- Gross Loan Portfolio USD, 2010: 612,828.7
- Number of active borrowers 2010: 3,093
- Average loan balance per borrower USD, 2010: 198.1
- Deposits USD, 2010: 523,138.4
- Assets USD, 2010: 3.7 million

Products and Services:

- Loans

Technology Integration:

- MBWin Loan Tracking Software from FAO/GTZ Microbanker.

TECHNOLOGIES UTILIZED

MFIs in sub-Saharan Africa employed a variety of off-the shelf and custom software and hardware solutions to solve problems in these six categories. Often the

technology packages, built as multi-purpose solutions for commercial banks, spanned more than one category. A summary of the vendor solutions, partnerships, mobile technologies, and third-party services utilized by MFIs in the study follows. The list is not comprehensive, as most MFIs report technical solutions in one or more categories without naming their suppliers. In all cases, the solution is presumed to be equally as effective as one of the identified solutions.

- **MBWin** from **FAO/GTZ Microbanker** is an integrated loan tracking solution utilized by OI-TZ.
- **Kiva** is an IT-enabled fundraising partnership enabling access to individual donors, and is utilized by SAT and UOB.
- **Orbit** is a full-service banking solution provided by Neptune Software, and is utilized by UGA.
- **Oikocredit** is an internet funding portal operating out of the Netherlands, and is utilized by UGA.

PERFORMANCE MEASURES

Three statistics were drawn from the 2011 financial reports of the MFIs: **gross loan portfolio yield (GLPY)**, **return on assets (ROA)**, and **profit margin**. Return on Assets and GPY are widely cited MFI performance metrics. Profit margin was selected to account for the ongoing expense of many IT investments. The benefits of a new technology solution should outweigh its costs, resulting in higher profit margins among MFIs with heavier investment in IT. This may not always be the case. The presence of profit margin is meant to test the success or failure of MFI

tech initiatives' break-even effectiveness, while GPY and ROA reflect their impact on basic operational effectiveness.

HYPOTHESIS

The statistical analysis of MFI data will test the assumption that upgraded information technology infrastructure is related to higher performance in MFIs.

CONCLUSIONS

The technology usage breakdown (Fig. 5) reveals a few notable trends even before statistical analysis. Most notably, none of the largest MFIs in sub-Saharan Africa are yet integrated with a mobile currency solution. Kenyan telecom Safaricom's M-PESA transaction volume has exceeded any other single financial services provider on the continent. Certainly it is possible for MFIs to offer better service with fewer staff through the application of mobile banking, but implementation difficulties and customer service may be factors. Some current Safaricom banking clients complain of its "bully" tactics and slow response time (Sadana, et al. 2011). Whatever the reason, this proven technology has not yet been implemented by the ten largest MFIs in sub-Saharan Africa. A tremendous market opportunity exists for a mobile banking solution geared towards the needs of microfinance. For this reason mobile currency has not been expunged from the study, despite its lack of adoption by any of the test set of MFIs.

	Loan Tracking	Data Analytics	Mobile Currency	Outreach/ Funding	Staff Support	Additional Services
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SAT	X			X		X
OIB						
OIS	X					X
UGA	X	X		X		
UOB				X		
BOM				X		
PAM						
Opp-SA	X				X	
Opp-K				X		
OI-TZ	X	X				

Fig. 5: IT integration among top 10 MFIs by Gross Loan Portfolio, 2010

First, the performance measures were tested for a relationship with gross loan portfolio size. Is the performance of an MFI correlated with the volume of loans it makes? If a relationship existed here, then it would have to be accounted for to prevent interference with tests of IT infrastructure effectiveness. Higher-volume MFIs would naturally have the resources to deploy more sophisticated IT systems, but capital expenditures are not so simple in the world of microfinance: a grant from a government or international body could provide any accredited MFI with the capital that only the largest could generate organically.

MFI name	Country	Gross Loan Portfolio	Profit Margin	Return on Assets	Portfolio Yield
SAT	Ghana	36939397	0.13	0.04	0.63
OIBM	Malawi	32497187	-0.19	-0.04	0.45
OISL	Ghana	24320180	0.08	0.03	0.71
Faulu - UGA	Uganda	14117688	-0.15	-0.05	0.46
UOB	Rwanda	12406867	0.1	0.04	0.52
BOM	Mozambique	7188330	-0.32	-0.12	0.64
PAMF-MDG	Madagascar	5886355	-0.61	-0.15	0.32
Opportunity Finance	South Africa	5309889	-0.15	-0.06	0.4
Opportunity Kenya	Kenya	4872251	-0.26	-0.08	0.35

OI - TZA	Tanzania	1795494	-1.3	-0.38	0.47
Fig. 6: Selected MFI performance measures, ordered by GLP size.					

To determine the relationship between size and performance, the selected MFIs were compared in a basic linear regression. Gross loan portfolio was entered as the dependent variable over profit margin, return on assets, and portfolio yield. The resulting model found none of the three variables to be significant (Fig. 7). The calculated p-value for profit margin, ROA, and GLPY was well above the .05 level of significance for all three variables.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4444461.920	15125795.823		-.294	.779
	profit_margin	-89300058.248	62854364.278	-3.056	-1.421	.205
	ROA	3.484E8	2.111E8	3.493	1.650	.150
	GLP_Y	44360677.982	27807102.320	.461	1.595	.162

a. Dependent Variable: GLP

Fig. 7: Regression analysis of performance measures against loan portfolio size.

Having established that the size of the MFI is not a factor in predicting its performance measures, we can apply those measures to analysis of IT infrastructure

without fear of interference from GLP size. Because the data indicates only the presence or absence of a type of IT as a dichotomous variable, a binomial logistic regression is necessary. However, in this test the dichotomous variable must be the dependent variable. To get around this statistical hurdle, the next test uses MFI performance statistics to predict the presence of a single type of IT infrastructure. The logistic regression therefore looks for a relationship between MFI performance and the usage of one of the six categories of technology. The test results are displayed in **Fig. 8**.

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1a profit_margin	-598.321	305087.896	.000	1	.998	.000
ROA	1943.998	938225.929	.000	1	.998	.
GLP_Y	488.637	155474.828	.000	1	.997	1.630E212
Constant	-289.933	91289.166	.000	1	.997	.000

a. Variable(s) entered on step 1: profit_margin, ROA, GLP_Y.

Fig. 8a: Financial Services Partnership

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1a profit_margin	873.724	252028.995	.000	1	.997	.
ROA	-2562.814	869731.761	.000	1	.998	.000
GLP_Y	-177.081	80508.757	.000	1	.998	.000
Constant	66.005	29351.099	.000	1	.998	4.632E28

a. Variable(s) entered on step 1: profit_margin, ROA, GLP_Y.

Fig. 8b: Staff Support Technologies

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1a profit_margin	27.339	23.194	1.389	1	.239	7.469E11
ROA	-77.911	68.486	1.294	1	.255	.000
GLP_Y	-2.843	7.681	.137	1	.711	.058
Constant	2.275	4.396	.268	1	.605	9.729

a. Variable(s) entered on step 1: profit_margin, ROA, GLP_Y.

Fig. 8c: Web Outreach Tools

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1a profit_margin	9.725	21.315	.208	1	.648	16723.897
ROA	-45.835	74.727	.376	1	.540	.000
GLP_Y	-2.601	10.900	.057	1	.811	.074
Constant	-1.604	5.004	.103	1	.749	.201

a. Variable(s) entered on step 1: profit_margin, ROA, GLP_Y.

Fig. 8d: Data Analytics Software

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1a profit_margin	7.307	15.382	.226	1	.635	1490.464
ROA	-28.022	51.978	.291	1	.590	.000
GLP_Y	6.045	6.409	.890	1	.346	421.852
Constant	-3.187	3.439	.859	1	.354	.041

a. Variable(s) entered on step 1: profit_margin, ROA, GLP_Y.

Fig. 8e: Loan Tracking System

As is evident from the tables in Figure 8, the logistic regression test found no evidence that the MFI performance is predictive of technology implementation. No variable in any test meets the .05 level of significance to indicate a relationship between the performance measure and the presence of a particular technology. The conclusion of

the experiment can only be the rejection of the hypothesis that greater information technology infrastructure is related to better MFI performance.

SUGGESTIONS FOR FURTHER RESEARCH

Sufficient data on MFI performance exists to draw conclusions about whether an institution is succeeding or failing. However, more work is needed to determine the factors for their success or failure. Beyond best practices documents and press-oriented reports, little information exists on the type of technology infrastructure installed at MFIs and the extent to which that infrastructure is truly operated into daily operation. This analysis was limited by the necessity of representing these technologies as dichotomous variables. Future studies can draw more nuanced conclusions with access to quantitative usage data of microfinance information technology infrastructures.

Further research must also be conducted to explore the role of mobile technologies in microfinance. The explosive growth of mobile network access in the developing world will continue to revolutionize the sectors it touches, including banking. Early MFI reports that the costs of doing business with mobile networks operators are not worth the benefits are troubling, given the inevitable significance of operators' technology. This study was limited from incorporating any data about the mobile phone due to a startling lack of adoption among MFIs in the data set.

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