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David Weber

Information Systems, Arizona State University, Tempe, AZ, United States., uday.kulkarni@asu.edu

Uday Kulkarni

Information Systems, Arizona State University, Tempe, AZ, United States., dmweber@asu.edu

Frederick Riggins

Information Systems, Arizona State University, Tempe, AZ, United States., frederick.riggins@asu.edu

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Breadth and Depth: The Impact of ICT Adoption on Outreach Capabilities of Microfinance Institutions

David Michael Weber
Arizona State University
dmweber@asu.edu

Uday R. Kulkarni
Arizona State University
uday.kulkarni@asu.edu

Frederick J. Riggins
Arizona State University
frederick.riggins@asu.edu

ABSTRACT (REQUIRED)

A decade ago, the microfinance industry prided itself on its trends toward financial and operational sustainability. Recently, investors, donors, lenders, regulators, and microfinance institutions have been more concerned with social and outreach performance. Transactions cost and distance theories inform a new ICT-enabled microfinance institution (MFI) outreach theory positing that information and communication technology (ICT) adoption among MFIs will result in direct improvements to MFI operations and a greater capacity for poverty and geographic outreach. These propositions are modeled using a case study methodology with primary research materials collected from 14 microfinance institutions in 8 countries. Using a pattern-matching mode of analysis, we find that different ICTs impact two types of outreach: geographic and poverty. Policy, database, and software-related ICT adoption activities impact poverty outreach due to their support of flexibility and information. Infrastructure, networking, hardware, and telephony ICT adoption activities impact geographic outreach since these areas support connectivity.

Keywords (Required)

Microfinance, development, MFI, global, international, ICT adoption.

“The shift toward social performance is occurring... industry players are under increasing pressure to adjust incentives toward [a] social mission first and foremost.”

-JD Bergeron, Director of Social Performance at Kiva.org

INTRODUCTION

Muhammad Yunus (2007) founded the Grameen Bank in 1983 to provide basic financial services to a population of rural female Bangladeshis. The microfinance industry has grown from a \$640M industry in 2004 to a predicted \$20B by 2015 (Dieckmann, 2008).

One of the “promises” of microfinance initiatives is self-sustainability (Morduch, 1999). This aspect makes microfinance a unique approach from most other charitable attempts at poverty reduction. Unfortunately, this initiative led many MFIs to favor financial performance goals over social performance goals and neglect clientele with the greatest need. The pendulum is swinging back toward social performance with “tools, methodologies, and assessment frameworks” (Bedecarrats, Angora, and Lapenu, 2009) introduced to the industry in recent years (Copestake, 2007). The most recent *Microfinance Banana Skins Report* (CSFI, 2011) stated that “microfinance has come of age, and with that, new issues have arisen. In an increasing number of markets, the rapid rate of growth and outreach means that microfinance is confronting the same forces of competition, credit cycles, and consolidation seen in other sectors.”

One would think that there is a tradeoff between social performance and financial performance, but research suggests this is not the case. While MFIs with outreach strategies do have greater operational costs, other benefits such as staff productivity and portfolio diversification outweigh these costs. Bedecarrats et al. (2009) state the reason for this is that MFI’s with broader outreach strategies have greater client participation and work in markets with lower levels of competition. They also generate a greater social impact.

Many industries adopt information and communication technologies (ICTs) for their various benefits and the microfinance industry is no different. ICTs reduce coordination and transaction costs without increasing risk (Malone, Yates, and Benjamin, 1987). This partly explains the rapid adoption of technology in the past 20 years in industries worldwide. During the period 2004-09, the ICT penetration in developing countries increased 3 to 4 times¹. The microfinance industry, however, lacks IT skills and has been slow to adopt ICT. In 2004, 40 percent of MFIs used manual ledgers to manage their portfolios and track loan payments; as a result, these MFIs took on average 4.9 days to discover a missed loan payment (Ivatury, 2004). A follow-up study in 2008 revealed negligible improvements over the following four-year period². ICT “underpins an MFI’s ability to track loan repayments, sustain growth and produce reliable reporting and data analysis” (Ivatury, 2004). If MFIs neglect technology adoption, they “will be overtaken by mobile network operators and large banks who figure out how to get into rural areas and go down-scale” (CSFI, 2011).

This study uses case studies to explore the impact of ICT on MFI operations and outreach. We use grounded theory building, semiotics, and content analysis methodologies to develop a detailed research model depicting the relationships between primary conceptual categories in the context of ICT adoption and use in the microfinance industry. A qualitative approach allows us to ask *how* and *why* research questions. The answers to these research questions should explain present circumstances and trace operational links over time among MFIs (Yin, 2008):

- (RQ1) How does ICT adoption impact MFI operations? Which ICTs impact which MFI operations?
- (RQ2) How does ICT adoption impact MFI outreach? Which ICTs impact MFI poverty outreach? Which ICTs impact MFI geographic outreach?
- (RQ3) How do changes in MFI operations brought about by ICT adoption impact MFI outreach? Which changes impact MFI poverty outreach? Which changes impact MFI geographic outreach?

THEORETICAL BACKGROUND AND PROPOSITIONS

This research draws on elements of transactions cost and distance theories in an analysis of ICT in the microfinance industry.

¹ <http://www.itu.int/ITU-D/ict/publications/world/world.html>

² <http://www.cgap.org/p/site/c/template.rc/1.26.10622/>

Transaction cost theory views the cost of a good as the all-in costs of economic exchange. The all-inclusive costs of an economic transaction include search costs, time costs, shipping costs, transaction costs, and coordination costs. Related to transaction cost theory is the electronic markets hypothesis, which suggests that ICT decreases search and coordination costs without increasing transaction risk (Malone et al., 1987). In other words, there are benefits available to market participants who strategically employ various technologies (Hess and Kemerer, 1994). In the context of the microfinance industry, the benefits of ICTs are realized in cost savings from transactions.

MFI's businesses are heavily transaction-based, with a large number of small loans. Poor and geographically distant clients have relatively larger transaction costs than wealthy, geographically close clients (Bedecarrats et al., 2009). Administering loans to distant customers requires increased travel and time costs to disburse the loan and enforce repayment. Each loan also has fixed costs, such as labor to enter information into their systems, screening of borrowers, and processing of disbursement and repayments, etc. Hence, microloans require higher interest rates for MFIs to maintain financial sustainability. A reduction in transaction costs increases an MFI's ability to serve poor and distant clients without as sizable of a sacrifice of increased costs.

Distance theory. Transaction costs increase with distance. Monitoring costs (Sussman and Zeira, 1995) and information asymmetries (Hauswald and Marquez, 2003) increase in a direct relationship with the geographic distance separating lender and borrower. Distance was previously an impediment to communication and trade. With advances in information and communication technologies, the concept of geographic distance and proximity is becoming less of a barrier.

In the microfinance industry, the poorest clientele are far from urban centers. It is more costly for MFIs to service distant borrowers for the reasons stated above. MFIs deal with these increased costs by charging higher interest rates or by decreasing the costs associated with serving distant clients. An analysis of the microfinance industry in Niger revealed that distant borrowers experience higher interest rates, more restrictive loan conditions, more intensive screening and greater delays to obtain a loan than geographically close borrowers (Pedrosa and Do, 2008).

ICT-enabled MFI outreach theory. Informed by these theories, we summarize a new *ICT-enabled MFI outreach theory*: ICT adoption among MFIs will result in direct improvements to MFI operations (P1) and a greater capacity for poverty and geographic outreach (P2). MFI operations serve as a mediator between ICT adoption and outreach impact (P3). Case study methodologies employ propositions, not testable hypotheses with operationalized variables. The goal of these *conditional propositions* (Van de Ven, 2007) are to direct attention to the elements of the study (Yin, 2008), which in this case are ICT adoption, MFI operations, and MFI outreach. This logic suggests the research model and propositions in Figure 1:

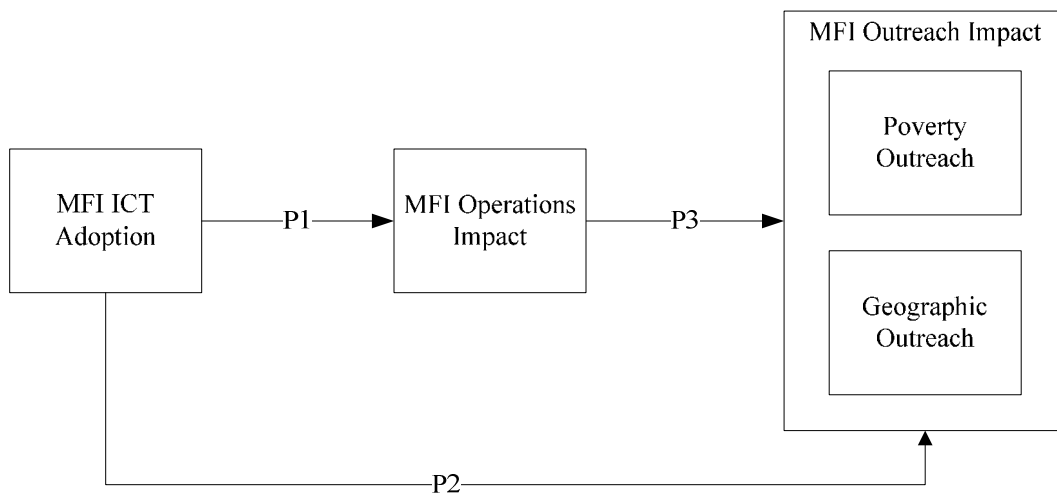


Figure 1: Research Model and Propositions

RESEARCH METHODOLOGY AND RESEARCH DESIGN

Yin (2008) states that the case study methodology is preferred when (1) *how* and *why* research questions are explored, (2) the researcher exhibits little control over events and (3) the research focuses on a contemporary phenomenon in a real-life context. Our research aligns with these qualifiers since (1) our research questions are posed as *how* and *why* questions, (2) the researcher's time in the field collecting interview responses and observing staff members had little to no impact on the events of interest - adoption of ICTs, performance of operations, or outreach capabilities of visited MFIs, and (3) since members of

the microfinance industry are technology adoption laggards, many real-life MFIs are in the midst of a technology adoption phenomenon. The case study methodology permits us to use the multiple sources of evidence we collected in the field.

Research Design

The three main constructs in our research model are ICT adoption, MFI operations, and outreach. Our research materials converge on these constructs and allow us to show in detail the relationships between them. Each of these constructs has multiple dimensions as prior research suggests. For example, ICT adoption can be hardware and software related; it may result from a change in internal processes, and/or it may be a consequence of a country-level infrastructure policy. Initially, we plan to apply Kroenke's (2012) elements of an information system to categorize ICT adoption changes, but not be restricted by it, as we expect new, meaningful categories to emerge from our field observations. Similarly, we expect the impact that ICT adoption may have on MFI operations to fall into common discernable categories such as those related to security, transaction processing, data quality, communication, loan application evaluation, etc. Finally, the impact on outreach will be measured in terms of poverty and geographic outreach, as stated in our research questions.

ICTs can either impact outreach directly or through MFI operations as a mediator. We will map relationships between ICT adoption categories, types of MFI operation impacted, and MFI outreach categories by analyzing the quantity of ICT changes that impact specific outreach categories. After we compile our research materials, we expect these relationships to reveal themselves as patterns.

Our research design employs a multiple case study approach. Single case studies are necessary in the context of a unique, rare, or a critical scenario (Yin, 2008). Multiple case study approaches result in studies that are more robust (Herriott & Firestone, 1983). Research materials for this study come from 14 different MFIs across 8 countries. While MFIs exhibit many differences with respect to operations, technological capabilities, and clientele among others, the context of this study are MFIs around the world and not a specific subset of MFIs. We *pool* the findings from research materials and observe common patterns in order to test our theory through a clear set of propositions.

RESEARCH MATERIAL COLLECTION

Our research materials are from *multiple primary sources* (interviews, fieldwork, direct observation, written data sources, and e-mail messages). The *unit of analysis* for this study is the MFI while the *data collection source* is a staff member at an MFI. Between August 2011 and November 2011, the first author volunteered as a Kiva Fellow at Kredit Microfinance and VisionFund Cambodia, two MFIs headquartered in Phnom Penh, Cambodia. "Since 2007, the Kiva Fellows Program offered over 400 individuals a rare opportunity to put their skills to work in support of global microfinance. Applicants chosen for the program serve as Kiva's eyes and ears on the ground, working directly with microfinance institution (MFI) field partners in over 60 countries around the globe."³ As a Kiva Fellow, he followed a work plan working alongside MFI staff, visiting borrowers in the field, and liaising between Kiva and their network of field partners. This opportunity permitted him to conduct extended face-to-face in-depth interviews with staff at not just these two, but also other MFIs in Cambodia. To address the limited country-centric nature of our research materials, we employed the services of other Kiva Fellow colleagues stationed at MFIs in other parts of the world - South America, Latin America, Eastern Europe, Asia, and Africa. We communicated with them extensively and gathered email responses regarding ICT usage and MFI operations/outreach at the MFIs where they were stationed. The third set of research materials are fieldwork and direct observations while working closely with, and performing tasks for, a subset of the interviewed MFIs in Cambodia.

Research Material #1: In-Depth Interviews

The principal investigator personally conducted in-depth interviews with 11 staff members at 6 MFIs in Cambodia. The shortest interview conducted lasted one hour and the longest spanned many conversations over the period of several days. The strengths of interviews are that they focus directly on the topic of a case study and they provide unique insight on causal relationships and explanations (Yin, 2008).

We approached these interviews with a list of 13 multi-part questions prepared prior to arrival in Cambodia. The actual interviews often deviated from the prepared list of questions upon discussing an interesting anecdote, company history, or staff member opinions, because "...the actual stream of questions in a case study interview is likely to be fluid rather than rigid" (Rubin & Rubin, 1995). Not only are the direct responses an important part of the research materials, but also are the

³ www.kiva.org/fellows

researcher's inferences about how events transpired. Convergent evidence from multiple interviews, physical evidence, and common sense formulate the basis for these inferences (Yin, 2008).

Research Material #2: Kiva Fellow E-mail Responses

Eight Kiva Fellows located in countries outside of Southeast Asia participated in collecting information from their respective MFIs on our behalf and communicating it to us via extensive emails. These Kiva Fellows were embedded in their respective societies on similar assignments with similar responsibilities. Each had two to eight months of field experience before gathering their input. To structure their approach, each was asked a simplified version of the open-ended question set used in the Cambodia interviews. They were also encouraged to describe any examples they might have observed with respect to ICT impacting poverty and geographic outreach.

Responses from Kiva Fellows in seven different countries ranged from 171 to 518 words with a mean of 326.25 words and a standard deviation of 99.04 words. The strengths of documentation research materials like e-mails include stability since they are unobtrusive, exact, and can be reviewed indefinitely (Yin, 2008). The ICT penetration of the countries represented varies heavily. On the low end is Sierra Leone with 0.002 Internet users per capita (ranking order #206 out of 210 countries)⁴. The highest is Turkey with 0.180 Internet users per capita (rank #103). The average penetration for the countries represented in our research materials is 0.056.

Research Material #3: Fieldwork and Direct Observation

Both the fieldwork accomplished as a Kiva Fellow and the experiences of living and working among Cambodian MFI staff members complement the more formalized interview and e-mail research materials. The strengths of direct observation and fieldwork research materials are that they cover events in real time, enhance the tacit knowledge of the researcher, and cover the context of the case in a more complete fashion (Yin, 2008). Table 1 summarizes the sources and content of all research materials used in our analysis.

⁴ http://www.nationmaster.com/graph/int_use_percap-internet-users-per-capita. Data source: CIA World Factbooks from 2003 to 2008.

MFI Name	Country	In-Depth Interviews by the Investigator	Interview Material from other Kiva Fellows	Fieldwork / Direct Observation of the Investigator
Banco D-MIRO	Ecuador	n/a	yes	n/a
BRAC Sierra Leone	Sierra Leone	n/a	yes	n/a
Center for Community Transformation	Philippines	n/a	yes	n/a
Cooperativa San José (CSJ)	Ecuador	n/a	yes	n/a
CREDIT World Relief	Cambodia	• Founder	n/a	n/a
Hattha Kaksekar Limited (HKL)	Cambodia	• Environmental Social Officer • V. P. of Operations and COO	n/a	n/a
IMON International	Tajikistan	n/a	yes	n/a
Kredit Microfinance	Cambodia	• Reissue Coordinating Officer • Network Unit Manager • Partnership & Staff Loan Officer • Kiva Coordinator	n/a	Fieldwork and direct observation
Maxima Mikroheranhvatho, Plc.	Cambodia	• Kiva Coordinator • Assistant IT Manager	n/a	n/a
Maya	Turkey	n/a	yes	n/a
Micro Start	Burkina Faso	n/a	yes	n/a
Our Farmer Fund	Cambodia	• Fund Manager	n/a	n/a
SMEP Deposit Taking Microfinance Limited	Kenya	n/a	yes	n/a
VisionFund Cambodia	Cambodia	• Treasury Manager	n/a	Fieldwork and direct observation

Table 1: Summary of Research Material Sources

ANALYSIS AND FINDINGS

Pattern matching is a process that aims to determine links between categories through anecdotal evidence or frequency of occurrences (Yin, 2008). Researchers use this methodology to compare empirically based patterns with predicted ones. If the patterns collide, the results can help a case study to strengthen its internal validity (Trochim, 1989; Yin, 2008). Pattern matching is a preferred case study analysis methodology when answering how and why research questions requiring full and rich explanations of phenomena occurring within a context (Yin, 2008). We followed the six steps recommended by Miles and Huberman (1994) for pattern matching analysis:

(1) Putting the information into different arrays. We tagged text within our interview and e-mail response notes with specific references made to the three variables of interest: ICT adoption activities, the impact of these changes on MFI operations, and the impact on MFI poverty and geographic outreach. We recognized 25 different individual ICT adoption activities and classified these into seven categories of ICT adoption adapted from Kroenke's (2012) elements of an information system. In most cases, ICT adoption activities spanned multiple categories. Database change tracking, for example, fits in the Database category while call centers fit into the Hardware and Telephony categories.

We analyzed our tagged research materials for consistent patterns where ICT adoption impacted MFI operations. Interviews, emails, as well as field notes, repeatedly mentioned the following nine direct impacts of ICT adoption on MFI operations. Table 2 lists the nine operations changes along with the impact of ICT on operations:

MFI operations construct	Explanation of ICT's impact
Flexible Loan Products	Allows MFIs to offer a wider range of loan products or more flexible loan products with advanced software and loan tracking systems
Loan Monitoring	Decreases late payments and loan defaults via real time reporting and linked branch databases
Portfolio Analysis	Prevents multiple-lending to borrowers and decreases portfolio risk
Data Immediacy	Allows for decisions and loans to be made more quickly
Data Reliability	Decreases mistakes, mitigates data loss through offsite data backups, affords less error-prone human intervention due to mobile banking
Transaction Processing	Allows electronic disbursements, computerization and automation of loan disbursements and payments
Communications	Increases communication frequency between borrowers with mobile-phones and loan officers without the need for a face-to-face visit at the branch or village
Security	Allows electronic fund transfers instead of cash manually carried by MFI staff and vehicles, prevents malicious access to data and allows user-rights based roles in internal databases/software, using firewalls, authentication, etc.
Branch Banking	Increases the ability to open or sustain branches in geographic regions distant from headquarters

Table 2: MFI Operations Change Construct

(2) Making a matrix of categories and placing the evidence within such categories. We consistently observed many interactions between the conceptual categories of ICT adoption and the impact of these ICT adoption activities on operations. Table 3 shows the resulting matrix of the direct impacts of ICT changes on MFI operations as gathered from the research materials. The cells are populated with a designation of High (H) or Low (L) denoting the “strength” of impact that the ICT adoption activity had on each of the nine MFI operations constructs. This strength is a composite measure that includes: (1) the number of respondents that related the same impact, (2) the perceived intensity of the impact in their response, and (3) the investigator’s evaluation based on fieldwork and direct observations. For example, many respondents indicated a large impact of MIS upgrades on their MFI’s ability to expand their suite of loan products, thus deserving an ‘H’ designation in the cell for MIS evolution’s impact on Flexible Loan Products. Conversely, the impact that interactive real-time reporting has on flexible loan products is minor, given the weakness of research materials to justify this connection or minimal respondents noting this connection. Thus, we populate this cell with an ‘L.’ Finally, no respondents shared that adopting role-based user access rights in their MIS had impact on Flexible Loan Products, nor did we witness this connection in fieldwork or direct observations. Therefore, this particular cell is left empty. .

	Flexible Loan Products	Loan Monitoring	Portfolio Analysis	Data Immediacy	Data Reliability	Transaction Processing	Communications	Security	Branch Banking
Role-based user-access-rights MIS					H			H	L
Interactive and flexible real-time financial reporting	L	H	H	H	L		L		L
Nationwide centralized risk database		H	H		L				
MIS evolution (paper-spreadsheet-in-house-client/server)	H	H	H	H	H	H	L	L	L
Computerized market research	H	L	H		L				H
Integration between loan system and accounting system	H			H	H	H	L		
CRM software	H	L	H				L		L
Change tracking					H			L	
Migration from faxing to scan/e-mail				H		H	L	L	
Skype adoption and online conferencing				L		L	H		H
Remote desktop				H		L	H		H
VPN adoption				H		L	H		
Off-site data backup					H			L	
ATM system adoption and expansion		L		H	H	H	L	H	L
Increased branch Internet connection				H	L	H	H		H
Improved bandwidth				H		H	H		H
Country-level infrastructure improvements				H		H	H		H
PDA's for loan officers				H	H	H	H		L
Electronic money transfers		L		H	H	H	H	H	H
Call center		L					H		L
Mobile banking	L	H		H	H	H	H	H	L
Replacing dated PCs				L			L		
Digital photography of borrowers					L				
Mobile communication between MFIs and borrowers		H		H	L	L	H	L	

Table 3: ICT Changes and MFI Operations Relationship Matrix

(3) Creating data displays – flowcharts and other graphics – for examining the data. In this step, we map (1) the direct relationships between ICT adoption categories and MFI operations, (2) the direct relationships between ICT adoption categories and MFI outreach, and (3) the mediated relationship of ICT adoption on MFI outreach through MFI operations. Rectangles in the top third represent the seven categories of ICT adoption, rectangles in the middle third represent MFI operations impacted by ICT, and the diamonds in the bottom of the diagram represent MFI outreach. The resulting template is populated from our research materials in the following steps and displayed later in Figure 2.

(4) Tabulating the frequency of different events, (5) Examining the complexity of such tabulations, (6) Putting information in chronological order or using some other temporal scheme. The rationale for the determination of mapping the relationships is laid out in this step. First, to determine if a relationship exists between an element of ICT adoption and an element of MFI operations, we considered the quantity of ICT adoption activities where we observed a relationship in our research materials. We recognized that our categorization of ICT adoption activities into elemental categories sacrifices some of the granularity of our visual model. The sacrifice was made for the benefit of visual simplicity; a complete mapping incorporating all relationships can be reconstructed using the data from Table 3. Relationships between the ICT adoption categorical elements and MFI operations are shown in Table 4. High (H) and low (L) Cell values are separated with a '/'.

	Funding Access	Loan Monitoring	Portfolio Analysis	Data Immediacy	Data Reliability	Transaction Processing	Communications	Security	Branch Banking
Database (DB)	4/1	3/2	5/0	3/0	4/3	2/0	0/4	1/2	1/4
Policy (POL)	4/1	3/2	5/0	6/1	3/3	3/3	3/5	1/2	3/4
Software (SW)	0/1	1/0	1/0	1/0	2/1	0/0	0/1	1/0	0/2
Infrastructure (INF)	0/0	1/1	1/0	4/0	1/2	4/0	3/1	1/0	3/1
Networking (NET)	0/0	0/2	0/0	7/1	4/1	5/3	6/2	2/2	4/2
Hardware (HW)	1/1	2/2	1/0	5/1	5/1	5/0	3/4	2/3	0/5
Telephony (TEL)	0/1	2/1	1/2	2/1	1/1	1/2	4/0	1/1	1/2
Total High (H)	9	12	14	28	20	20	19	9	12
Total Low (L)	5	10	2	4	12	8	17	10	20

(note: High/Low)

Table 4: Direct Relationship Mapping

To map the mediated relationships between MFI operations impacts and outreach, we “based our inferences on convergent evidence from witnesses and physical evidence, as well as some unspecifiable element of common sense” (Yin, 2008). In other words, we noted where responses connect an ICT change made at their MFI with the changes that occurred from that change. Rationale for these mediated relationships is shown in Table 5.

MFI operations impact	Mediated impact on poverty outreach	Mediated impact on geographic outreach
Flexible Loan Products	Many, flexible loan products can meet the specific needs of the poorest borrowers better than few, specific loan products	n/a
Loan Monitoring	Borrowers who repay loans do not put their collateral at risk and benefit from greater access to future loans	n/a
Portfolio Analysis	Protects borrowers from accepting loans to repay other loans or loans they cannot repay	n/a
Data Immediacy	Reduced loan application processing time leads to faster funds disbursement	Electronic fund transfers allow MFIs to lend to geographically remote regions as quickly as close regions
Data Reliability	Ensures that the right loans are made to the right borrowers and market analysis reveals which borrowers to target.	Market analysis reveals unbanked / low banked geographic regions to reach out to
Transaction Processing	n/a	Lending to distant borrowers is less cost-prohibitive
Communication	n/a	Lower time-cost of information exchange between MFI branch and distant borrowers
Security	n/a	Electronic transmission of funds is just as secure over long distances as short distances
Branch Banking	n/a	Borrowers have less distance to travel to conduct business at an MFI office

Table 5: Mediated Relationship Rationale

We present our research model populated with our findings in Figure 2. The set of seven numbers in each MFI operations construct represents the direct causal relationships from each of the ICT adoption categories. These numbers follow the same pattern as the template in the ICT adoption categories at the top of the figure.. The leftmost five elements of MFI operations impact Poverty Outreach and the rightmost six elements impact Geographic Outreach, with the middle four elements influencing both.

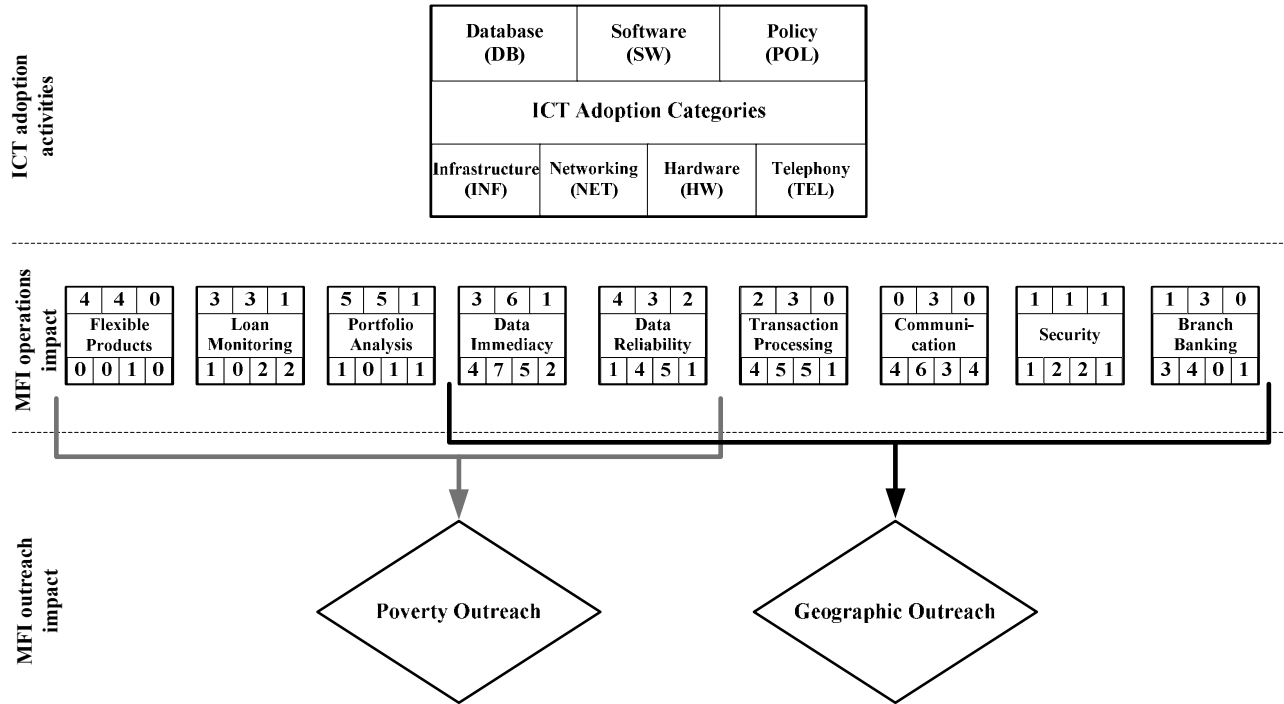


Figure 2: Research Model with Relationships

The populated research model in Figure 2 provides an informed framework for analyzing the nature of the impact of ICT adoption on MFI operations and outreach. Our first observation uncovered that all of the impact of ICT adoption on outreach is mediated through MFI operations. This finding is interesting as it suggests that ICTs do not, and perhaps cannot, directly impact outreach and MFIs must first realize changes in their operations by leveraging ICTs before they can realize changes in outreach.

In order to ascertain construct validity, we took the following two steps: First, our study uses ICT adoption as the element of ‘initial change’ and our method categorized these adoption activities using a version of Kroenke’s (2012) elements of an information system modified for our specific context and research materials. Second, we cite other theories and studies that inform our theory building. We attempt to address internal validity requirements by specifically looking for some of the rival explanations. We acknowledge that other unobserved factors likely contribute to improvements in operations and outreach; ICT adoption is one of several alternative explanations. One such rival explanation is that wealthier MFIs are able to invest in technology and dedicate more capital lending stock toward poor and distant clients, resulting in correlation between the two elements, but not necessarily causation. Another explanation is that outside funders share an increasing tendency to fund MFIs with a proven track record of strong outreach performance. In our research materials we did not observe support for these rival explanations. To account for external validity, we collected research materials at several MFIs spread over multiple continents. When pooled and placed into the framework of our model, the research materials fit into common patterns. Future research replicating our study may find results that deviate from ours, but given our sizeable and geographically diverse representation of MFIs, we anticipate more overlap from one replication to another. Finally, we address reliability by having documented procedures, asking the same questions at each MFI and with each respondent, and by assigning equal weight to each interviewee’s responses. Moreover, maintaining a case study database of not merely the list of the people and organizations visited, but also field notes, a narrative organizing findings, citations, and interview responses by question, also contributes to reliability (Bickman and Rog, 1997).

CONCLUSIONS, LIMITATIONS, AND FUTURE RESEARCH

This research contained herein demonstrates that ICT adoption enables MFIs to extend their outreach and provide financial services to very poor and very distant borrowers. The microfinance industry, if properly enabled by the right technologies, holds great potential for reducing global poverty. This industry is in a state of change and is in earlier stages of ICT adoption than many other industry counterparts. MFIs are also in the midst of an industry shift from a sustainability focus to an outreach focus.

Conclusions

To answer our research questions, we employed a qualitative case study approach. We collected and pooled research materials from 14 MFIs in 8 countries. Through the analysis method of pattern matching, we mapped ICT adoption categories to MFI operations change and outreach performance. This process revealed that there are certain technologies that impact poverty outreach and others that impact geographic outreach. Our analysis reveals that software, database, and policy ICT adoption impacts poverty outreach mediated through financial performance and loan portfolio improvements. In the same way, infrastructure, hardware, and telephone ICT adoption impacts geographic outreach mediated through security and branch banking operations improvements. Furthermore, ICT-enabled improvements in transaction processing, communications, data immediacy, and data reliability impact both poverty and geographic outreach.

This research can inform policy-makers, governments, microfinance institutions, and funding organizations interested in improving social performance who need to know which technologies impact geographic and poverty outreach. An MFI interested in improving their geographic outreach now has a basis for understanding that technologies related to connectivity and infrastructure are a better investment than technologies dealing with financial capabilities, flexibility, and information processing. Academics will benefit from this research as it suggests a new and creative means for modeling the relationships between technology and outreach performance.

Limitations

One of the common concerns expressed by case study methodology critics is that it offers little basis for scientific generalization (Yin, 2008). Case studies, by definition, are not samples that generalize to a population, but are generalizable to theoretical propositions. Another researcher could visit a different set of MFIs and arrive at conclusions that vary from the ones we present. We anticipate that these differences would not be significant since our analysis revealed multiple MFIs experiencing similar linkage between ICT adoption changes, MFI operations, and outreach. Another limitation is that of the 14 MFIs represented in our research materials, 6 are Cambodian MFIs and are also the only MFIs where in-depth interviews and fieldwork were personally conducted by one of the authors. Other Kiva fellows were relied upon in other countries to collect similar research material and, to some extent, this resulted in less detailed research materials from those countries. An ideal situation would have allowed for a less ethnocentric collection of first-hand research materials from more countries.

Interviews can suffer from bias due to poor questions, responses of what the interviewer “wants to hear,” and inaccuracies due to poor recall. Observations can bias outcomes when staff members know they are being observed. Documentation like e-mail suffers from selection bias, reporting bias, and deliberately withheld responses (Yin, 2008). To overcome these limitations, we approached the case studies and performed our analysis using a thorough and structured approach based on accepted guidelines by experienced case study methodologists (Yin, 2008; Myers, 1997).

Another limitation is that since these findings are pooled into a single research model, we cannot look at how the relationships differ for, say African MFIs, MFIs with more than 100 staff members, or MFIs with loan portfolios under \$100,000. Finally, the model fails to designate the strength of relationships or specific ICT adoption activities. As an example, the model will not reveal which of two options for ICT investment will yield the greater measurable impact on branch banking or geographic outreach.

Future Research

Future researchers can expand on our body of knowledge by addressing the exploratory research question “Why should MFIs adopt technology?” Our research provides evidence for patterns connecting ICT adoption to outreach. Future research is aimed at answering questions such as, what processes MFIs should follow in their adoption of ICT, what structural changes need to be made, what partnerships need to be forged, which ICTs need to be adopted and in what order? Also, a quantitative study using the main constructs of this research is planned to determine the relative strength of different ICTs’ impact on MFI operations and outreach.

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