FINANCIAL SERVICES ASSESSMENT

Outreach of M-PESA System in Kenya: Emerging Trends

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June 2010

Financial Services Assessment project can be found on the web at http://www.fsassessment.umd.edu/

ABOUT THE PROJECT

The *Financial Services Assessment* project is designed to examine the impact of financial services on the lives of poor people across the developing world. This project is funded by the Bill & Melinda Gates Foundation, which is committed to building a deep base of knowledge in the microfinance field. The IRIS Center at the University of Maryland, College Park, together with its partner, Microfinance Opportunities, will assess a diverse range of innovations in financial services. The results of this project will shed light on the design and delivery of appropriate financial products and services for the poor and the potential to scale up successful innovations to reach larger numbers of low-income households.

FUNDING

The Financial Services Assessment Project is funded by a $6 million grant from the Bill & Melinda Gates Foundation.

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ABSTRACT

This paper focused on the potential trajectory of the agent-based M-PESA system in Kenya. Interviews with M-PESA agents, financial institutions and key community members were carried out. The study finds ambiguity in defining agents with several layers of operators providing M-PESA services. M-PESA is expanding slowly to interior areas, and the volume and number of transactions fluctuate based on the seasons and time of the month. Rural and urban differences exist in terms of volume of transactions. Collaboration between financial institutions and M-PESA is becoming common to improve services and outreach. But, cash and electronic float shortages among agents and frequent service disruptions, and the inability to record M-PESA transactions in detail appear to limit M-PESA's effectiveness in meeting client demand on time.

ACKNOWLEDGEMENTS

The authors thank the Financial Services Assessment staff at the IRIS Center and Microfinance Opportunities for their hard work and efforts.

The authors wish to recognize the contribution of local research assistants in Kenya who conducted individual interviews and focus groups. Richard Amwayi, Andrew Otemba, Gustavus Muli and Sarah Mwendwa showed diligence and excellence in implementing focus groups with local communities about the outcomes of M-PESA on the community. Ebby Angawa, Daniel Kitili and Robert Kheyi provided translation and research assistance and contributed to interviews.

Pauline Vaughan, Rita Mwachandi, Waceke Mbugua and Adnan Adnan at M-PESA took time out of their busy schedules to meet with us on several occasions. They provided invaluable assistance in identifying agents, locations and other information that made our research possible.

The authors appreciate the representatives of the educational and health-care providers and other organizations who provided information on their institutions' usage of M-PESA. Thanks also go to the M-PESA agents and employees who agreed to participate in the study, and to all the participants of focus groups that made such research possible. The authors owe a debt of gratitude to PACT-Kenya for being our local affiliate and finalizing our research clearances. Special thanks go to Titus Syengo, Anthony Mueke and Loise Maina of PACT-Kenya for their support, follow-through and legwork on our behalf. Their collegiality facilitated this study. Finally, we are especially grateful to Janet Mumo and the staff of the Kitui Development Centre for their aid in facilitating the field research. KDC was our home in Kitui and they provided much-needed advice, resources and staff.

OTHER NOTES

The exchange rate during the research period was 75 Kenyan shillings = 1 U.S. dollar.

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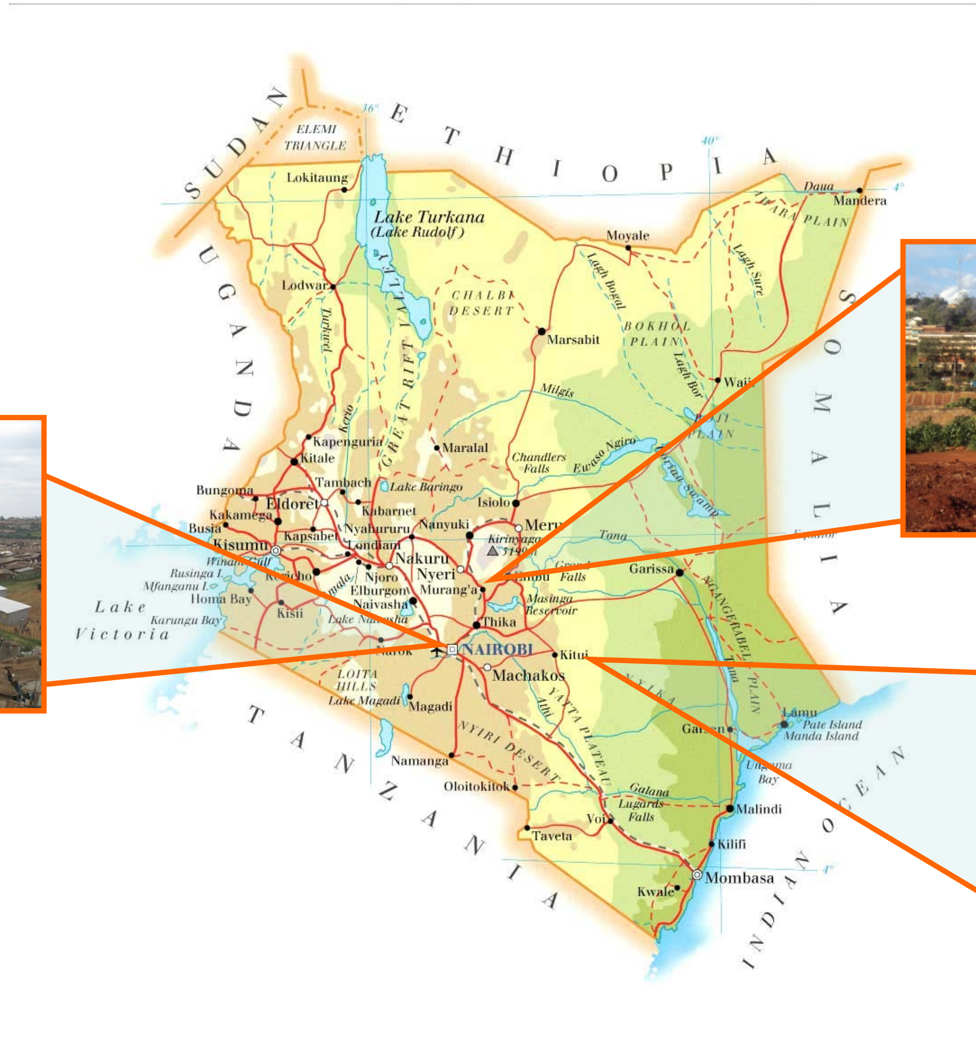
ACRONYMS

BMGF	Bill & Melinda Gates Foundation
FGD	Focus Group Discussion
FSA	Financial Service Assessment (the overarching project name)
FSM	Financial Service Matrix
KDC	Kitui Development Centre
MFI	Microfinance Institution
M-PESA	An e-money transfer system pioneered by Safaricom, Kenya's largest mobile service provider.
NGO	Non Government Organization
ROSCA	Rotating Savings and Credit Association
SACCO	Savings and Credit Cooperative Organization

STUDY AREAS

Kibera



Murang’a

Kitui

SUMMARY

In this paper we summarize our initial findings on recent trends in the outreach of M-PESA in our study locations. M-PESA is an agent-assisted, mobile phone-enabled, person-to-person payment and money transfer system. It allows users to store money on their mobile phones in an electronic account and deposit or withdraw money at one of M-PESA's numerous agent locations. It is at the agent location where cash is converted to e-float (the electronic currency used on M-PESA) in the form of a deposit. E-float is changed into cash for a withdrawal.

This paper is based on information gathered for a larger study conducted by the IRIS Center on the community effects and potential trajectory of the agent-based M-PESA system in Kenya. We found ambiguity in defining agents, and several layers of operators providing M-PESA services. Most agents in our study were successful business owners prior to their position with M-PESA and were primarily self-financed or used informal sources of finance for their entry into M-PESA.

We also found that access to M-PESA is expanding to interior areas. In usage patterns we found that:

- The volume and number of transactions fluctuate based on the seasons and time of the month.
- The volume of withdrawal is higher in rural locations compared to urban locations.
- Within rural locations, women tend to be the primary customers and mainly withdraw funds.

Collaboration between financial institutions and M-PESA is becoming more common to improve services and outreach. M-PESA's effectiveness in meeting client needs appears to be limited by bottlenecks such as cash and electronic float shortages among agents, as well as frequent network service disruptions. In addition, some organizations and businesses have found that M-PESA transaction records are not sufficient for their documentation needs, and are thus limited in their ability to officially link to M-PESA.

I. INTRODUCTION

M-PESA, an agent-assisted, mobile phone-based, person-to-person payment and money transfer system, was launched in Kenya on March 6, 2007. M-PESA stands for “mobile money”; pesa is the Swahili word for money or cash. By January 2010, over nine million Kenyans had become registered users of M-PESA. The monthly value of person-to-person transfers by December 2009 was over KSH 26 billion (approximately U.S. $330 million). There was also a phenomenal growth in the number of agents from 7,000 in March 2009 to almost 17,000 in January 2010. These agents are located throughout urban and medium-to-large market centers in the majority of geographic areas of the country.

In this paper, we summarize our initial findings on recent trends in the outreach of M-PESA in our study locations in Kenya. This paper is based on information gathered during the first stage of field work conducted by The IRIS Center during September – December 2009 as part of a larger study initiated to identify the economic effects of M-PESA in Kenyan communities (see Plyler et al., 2010 for details on community effects of M-PESA). To that end, this study sought information on the outreach of mobile-enabled, agent-based services provided by M-PESA. It included identifying the agents and the transactions they facilitate as well as recent trends in agent organization and transaction activity to inform donors and policymakers of the potential trajectory of M-PESA.

Key questions addressed in this paper include:

1. Who are the M-PESA agents?
2. What are the recent trends related to the outreach of the agent-based M-PESA system?
3. What factors are likely to affect the outreach of M-PESA?

Data were gathered in three districts: Kibera, Murang’a and Kitui, using a “deep-dive” methodology that includes both quantitative and qualitative tools to collect in-depth data from the same respondents: M-PESA agents and other financial service providers in our study locations.

II. SAMPLING, AND STUDY TOOLS AND LOCATIONS

From September to December 2009, IRIS staff members and locally-hired staff carried out fieldwork in Kenya. The study was conducted in three districts: Kibera and Murang'a in Central Province and Kitui in Eastern Province. The districts were chosen to represent Kenya's population, economic activities and M-PESA agent distribution, as well as for logistical considerations.

Within each of the three sampled districts, we selected three locations in which to carry out the study. The selection was based on:

- Geography
- M-PESA agent clusters
- Urban or rural nature of the location

The goal was to get a mixture of rural and urban populations, so we selected two districts (Murang'a and Kitui) that have a large percentage of the population in rural areas and a significant town center, and one district (Kibera) comprised of an urban settlement in Nairobi. The M-PESA website only listed agent locations by province or city, not by district or other midsize divisions, which made it difficult to obtain agent information or directly factor agent locations into our strategy. Over 3,000 agents are located in Nairobi, over 1,000 agents reside in Central Province, and around 800 exist in Eastern and North Eastern provinces combined.

The town centers became important when locating M-PESA agent clusters. We knew from an earlier reconnaissance trip in August 2009 that Kibera, Murang'a town and Kitui town each had multiple M-PESA shops. We then used locations with agent clusters to select sub-locations (the administrative unit one step above the village in Kenya) and villages in each of the three study districts. In Murang'a and Kitui, we located at least one M-PESA branch outside of the main town center to look for similarities and differences in community effects between town centers and their rural counterparts.

We found that quantitative or qualitative tools by themselves do not help much in explaining the "why" and "how" of the effects of the focus of the study. Therefore, we used a "deep-dive" methodology, developed by IRIS, to gather comprehensive information to capture the extent of the effects, as well as to explain the "why" and "how" of the effects of the project. The deep-dive method is a series of data-gathering efforts from the *same* subject where we tailor queries (quantitative and qualitative) to gather in-depth insights to know how the subjects behave and explain why they behave that way. The methodology can be applied for a randomized control sample, or a non-random sample.

For this study, we created a structured questionnaire to gather information from 25 M-PESA shops and daily M-PESA transactional log sheets to collect summary information on the transactions conducted by them. We used semi-structured guidelines to do case studies of seven of the owners of the participating M-PESA shops. In addition, we also conducted key informant interviews (KIIs) with 12 financial organizations (See Annex 1 for a list of the microfinance institutions, commercial banks and savings and credit cooperatives interviewed) using a semi-structured questionnaire in order to know their interactions with M-PESA and gain their perspective on the role of M-PESA agents in the community.

A. M-PESA SHOP QUESTIONNAIRES AND LOGS

To obtain detailed information on the M-PESA shops that serve our study areas, we conducted a series of interviews using a structured three-page questionnaire with shop workers at local M-PESA outlets. The initial interviews at the beginning of the study were conducted with 25 M-PESA shops. Seven were within the Kitui study area, eight in the Murang'a area and 10 in Kibera (See Fig. 1 for shop locations).

In addition, we obtained information from M-PESA shops on the volume and type of transactions occurring in the areas. We used a simple one-page daily transactions log sheet to understand the cash flow affected through the introduction of M-PESA and also the types of transactions conducted through M-PESA in the area. Participants in initial interviews were asked to log in daily transaction information for the shop from mid-October 2009 through early February 2010. We collected these sheets from the workers approximately every two weeks. As mentioned above, 25 shops completed initial interviews, and of those, 21 shops provided daily log sheet data which was used in this report.[1] However, only 11 shops continued to participate until the last of the log forms were collected in February 2010. While there were some occasional missing data for some days, most shops provided data for the majority of the time period with participation dropping off primarily in early 2010.[2]

While a full set of data on the types, sizes and times of M-PESA transactions by agent location could provide a rich source of information for study, it was difficult to obtain such data. To date, and to our knowledge, Safaricom headquarters has not made transaction data available to those researching M-PESA.[3] Therefore, we obtained the data used in this study through self-reporting by the individuals working at each participating shop. As the store data are hand-recorded by store workers, the amount and level of detail requested from participants had to be limited.[4]

TABLE 1 STUDY SAMPLE OF M-PESA STORES FOR INITIAL INTERVIEWS

Shop Location	Number of Shops Completing an Initial Interview	Number of Shops for which daily log sheets were used
Kitui District	**7**	**6**
Town	5	4
Rural	2	2
Murang'a District	**8**	**6**
Town	7	5
Rural	1	1
Kibera	**10**	**9**
Total	**25**	**21**

Source: IRIS Center study

B. CASE STUDIES

IRIS staff also carried out case studies using semi-structured interview guidelines with seven owners of the participating M-PESA shops. Of these seven, four were M-PESA agents, two were sub-agents and one was the chairman of a SACCO which owns an M-PESA shop. The participants were chosen based on their presence in the study area and willingness to participate. Additionally, case study participation was requested only if the owners were local to the study area.[5] The case study participants were selected from the

[1] Two shops discontinued participation after the initial interview and did not submit any log forms. Data from another two shops were dropped as the information was incomplete and of low quality.
[2] As the data collected from the shops were entirely self-reported, it is not possible for the authors to independently verify its validity. Consistency checks were done on the data, and inconsistent data were removed from analysis.
[3] Safaricom (particularly Pauline Vaughan and her team) introduced the IRIS researchers to the M-PESA agents. The letter of introduction proved invaluable in achieving study participation by individual shops.
[4] Participating shops were provided a small monetary gift at the mid point and end of the data collection period as appreciation for their participation. However, participation was entirely voluntary, and they were not informed about any compensation to encourage their participation.
[5] Many M-PESA outlets are directly owned by an individual or company that hires managers and other employees to work in the shops. For the purposes of this research that examines local community effects, we conducted case studies only with owners who were local to the community. We did not attempt to interview company headquarters or owners based elsewhere.

initial 25 participating M-PESA shops in order to deepen understanding of the owner's entrance into the M-PESA business and to identify what motivated and facilitated this entrance.

C. FINANCIAL SERVICES KEY INFORMANT INTERVIEWS

To gain a better understanding of how M-PESA fits in the communities' portfolio of available financial services, we conducted key informant interviews with representatives of area financial organizations. Representatives of 12 organizations consented to be interviewed: five in microfinance organizations, five in bank branches (two of the same bank in different locations) and two in savings and credit cooperative organizations (SACCOs). (See the list of participants in Annex 1.)

Triangulation of all the information collected through the tools above, along with a literature review of the research to date on M-PESA agents, form the basis of this report. For additional information on the tools used in the study, please refer to Annex 2.

III. STUDY FINDINGS

A. WHO ARE M-PESA AGENTS?

Ambiguity exists in defining agents

There are almost 17,000 M-PESA points across Kenya as of January 2010, and they are not all alike. The term "agent" has been used interchangeably to refer to the M-PESA location itself (be it a stand-alone shop, in a financial institution or elsewhere), the owner of the shop and the person(s) running the shop.[6]

The majority of M-PESA tills are operated on a day-to-day basis by employees who serve as clerks at the M-PESA shops in the same way that an employee would work the counter of any retail store. Of the 25 shops initially interviewed, only one (located in Kibera) had the owner (a sub-agent) as the primary person conducting M-PESA transactions. The employees in our study are generally paid a monthly salary and do not share in the store's commission.

FIGURE 1 M-PESA STAND IN KIBERA

Two general agent models are in place for M-PESA shops that deal directly with individual customers (there is also a third type of agent- "super agents" which are primarily banks and deal only with agent shops and not individual customers).[7]

The first is a single individual (or company) who directly owns and manages all of its outlets in various locations. To qualify to become an M-PESA agent, applicants were

[6] The Safaricom website includes the following as types of agents: "Safaricom-authorized dealers; other retailers with a substantial distribution network like petrol stations, distributors, supermarkets and registered SMEs; and selected banks and micro-finance institutions." (http://www.safaricom.co.ke/index.php?id=749)

[7] Safaricom, the parent company of M-PESA, does not directly own the M-PESA shops.

required to have sufficient resources to start at least three shops in separate locations. The current minimum investment required by Safaricom is 100,000 Kenyan shillings ($1,333) per M-PESA shop. This investment becomes the shop's working e-float balance, although some study participants reported working with smaller e-float balances. These requirements suggest high financial barriers to enter into the M-PESA business.[8]

The second model allows a company to have the relationship with Safaricom and manage the e-float for its shops, but not directly own the individual outlets. This has led to the emergence of "sub-agents," or individuals who would not qualify for M-PESA agent status independently to become M-PESA "owners."[9] For example, an individual who wishes to run one shop in a location could contact an established M-PESA agent, have that agent start the new shop, and the individual would have an agreement to run the shop under the company name.

Agents and Sub-Agents Tend to be Successful Business Owners First

Of the seven M-PESA shop owner agents interviewed for case studies, three of them came to M-PESA via mobile phone accessory sales and wanted to become M-PESA agents. The three all owned already-successful electronics shops when they began selling phone cards, then transitioned into M-PESA. Of the three, one of the owners was able to apply to M-PESA immediately, while the other two initially chose to work for an existing M-PESA agent as a sub-agent with the hope of eventually becoming agents themselves. In one instance, a well-known M-PESA agent in the area suggested to one of them to apply for M-PESA agentship. The electronic shop owner waited until he had the capital to meet the three shop requirement and then applied to be an agent. He has since expanded from three electronic shops to 22 M-PESA shops in less than two years, and plans to open several more this year. In another case, a successful electronics dealer in Kibera was approached by an M-PESA agent and became a sub-agent, splitting profits down the middle. Within a year he was an agent with three shops that quickly grew to 16. A third electronics dealer already had a successful shop in Murang'a, but wanted to own an M-PESA shop too. She contacted a company in Nairobi that owns many shops and acts as an agent; soon they had contracted with her as one of its sub-agents. She then found another company and did the same, and now she owns two shops. When she gets the third shop, she plans to apply to Safaricom to become an agent.

Two other agents and a sub-agent came to own an M-PESA shop because a relative or friend encouraged them to do so. In one case, the previous owner of an M-PESA shop lacked the necessary capital to keep the shop afloat, so a woman in Kitui bought it from him at a reduced rate with the help of her family and through her own substantial business holdings (she also owns a café and welding shop). In the other, a schoolteacher had a brother who was skilled in computer technology and convinced him to go into the business. They were able to purchase three shops at once and are looking to expand. Another agent came to the business with friends. They started a company together and pooled their money in order to meet the three shop requirement.

Finally, one agent, a *matatu* (public transportation vans) SACCO, got into the M-PESA business for two primary reasons: to improve the physical safety of its drivers (who no longer had to carry cash from customers) and to keep a segment of its business intact (carrying money/goods for customers).

In all cases, agents mentioned two key components to their success:

1. *Never run out of money,* even if you have to withdraw from your personal account. Customers are unforgiving if they come in to withdraw money or need to send it to someone and the agent cannot accommodate them. They will go to someone who can.
2. *Make customer service a priority*. Customers should always feel taken care of and respected. In one instance, an agent even acts as a money lender on the weekend, loaning money to community members. He said people now look to

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[8] Safaricom has some exceptions to the three location minimum requirement. Locations that may be approved for agent status with only one outlet include: banks, forex bureaus, hotels, supermarkets, petrol stations, hospitals, clinics, SACCOs, and remote locations (Safaricom website, 2010).

[9] See Jack and Suri (2009) and Mas and Nq'weno (2010) for additional information on the agent network, pricing structure, and background of M-PESA use.

him as *bwana pesa* ("Mr. Money") because he is seen as controlling the cash circulation in his area. Another sub-agent opens her shop on a Sunday if there is enough need. A third spends a lot of time training employees to interact with clients, and a fourth says her job is to make things easier for her customers.

Agents' and Sub-Agents' Entry: Self-Financed or Informally Sourced

None of the seven agents or sub-agents interviewed for the case studies obtained a loan from a bank to finance his or her entry into M-PESA. Each came up with the initial capital from other sources: either personal funds from an existing business, personal loans and/or funds pooled with friends. When asked why they did not secure the capital from formal sources, they said banks do not give loans to new business ventures.

> Kibera agent: "[It is] difficult to get a loan [to start] an M-PESA shop or any business."

B. OUTREACH OF M-PESA: LATEST TRENDS

M-PESA is Expanding to Interior Areas

Currently available data to the public from Safaricom on M-PESA agents indicates that the majority of the shops are located in cities and smaller towns. It is to be expected that new products and services would be tested first in larger cities before expanded into interior areas. But, few agent shop locations in the current list could be considered as interior areas of the country. A list presented in 2008, however, did not have any shops in the interior. This trend indicates that M-PESA has begun to expand into interior areas, albeit slowly.

Locating agents in the interior parts of districts for our study was challenging. IRIS made special efforts to locate agents in different areas within each study location.[10] In Kitui and Murang'a, this included M-PESA shops in small towns or shopping centers outside of the main town. It appeared that more M-PESA shops had opened in smaller market settings in Kitui than in Murang'a. Within Kitui town and Murang'a town, we found that M-PESA shops tend to cluster in the town center and near other financial service providers. One of the Kitui District shops was in Wikililye, a small shopping center on an unpaved road, about a 15- to 20-minute drive from Kitui town by private vehicle. The second participating rural shop was in Katulani, a shopping center with a weekly market, approximately a 35- to 40-minute drive from Kitui on unpaved road. The rest were located in Kitui town. Of the Murang'a area shops, we found only one in Kambirwa, a small shopping center approximately a 20-minute drive from Murang'a town by private vehicle on unpaved road. The other participating shops were in Murang'a town. In Kibera, the M-PESA locations tended to be in areas with other businesses. Few M-PESA shops are found in the interior of Kibera, and there are no banks located within Kibera. One of the study participants, located farther into the interior of Kibera than most, had opened only a month prior to the start of the study. The director of a Kibera-based MFI mentioned that M-PESA has been more available than banks to the less educated community members due to fewer barriers to use M-PESA (such as forms to fill out).

The current trend of expansion into rural areas could be attributed to a combination of demand for M-PESA services in those areas, the ability of agents to expand in rural areas and Safaricom's recent licensing policy restrictions in some over-serviced urban areas. Nonetheless, if M-PESA outlets are able to operate in more rural locations on a sustainable basis, it is likely to improve outreach and one can possibly expect a noticeable impact on rural communities.

Growth of New Adult Client Base Slowing Down

There was general agreement among shop employees who had been working with M-PESA for long enough to notice changes in the customer base (some had only a few months experience), that the number of new registrations per day in their shops had decreased

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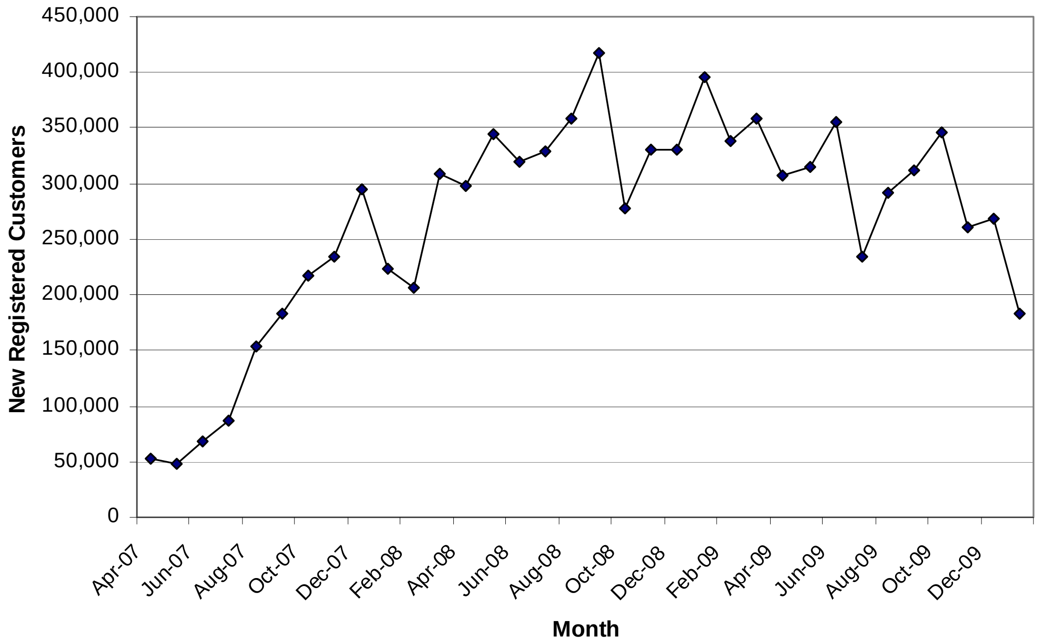
[10] The researchers spoke with administrative officials for the study areas, as well as community members and visited villages and market centers to determine the locations of M-PESA shops.

over time. The nationwide data from Safaricom's website in March 2010 confirm the trend (see Figure 2).

FIGURE 2: NATIONWIDE NUMBER OF NEW M-PESA CUSTOMER REGISTRATIONS, LAUNCH - JANUARY 2010



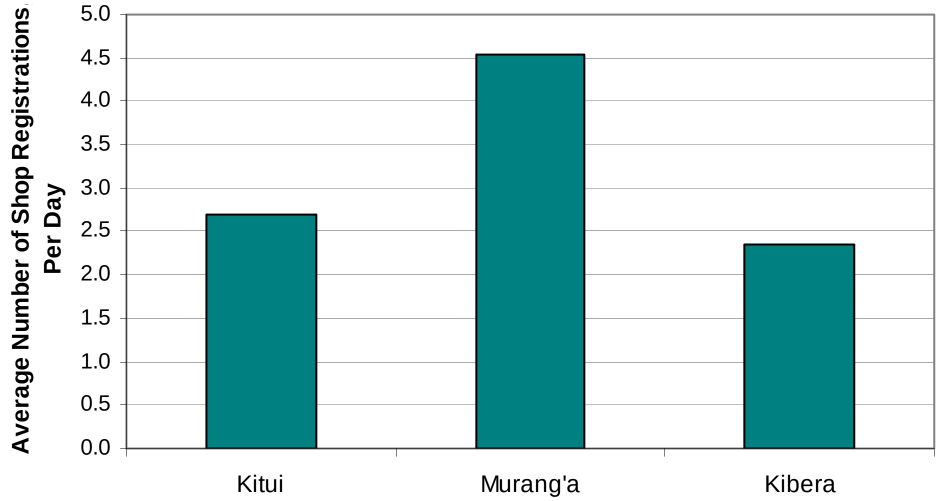
Source: Safaricom website, March 2010

There are indications of saturation among adult populations in urban areas and town centers in our study areas where M-PESA has been available for almost three years. According to a study done by FinAccess (2009), approximately 40 percent of the Kenyan adult population uses M-PESA. Some shops in our study reported that many of their new registrations are students who have recently graduated and received their government-issued identification at age 18 (a document required to sign up for M-PESA).

Participating M-PESA shops in our study also reported daily new registrations, with stores reporting average numbers of new customers signing up of one to eight per day, but half of the shops averaged fewer than two per day. One Murang'a town location was more prolific in new sign-ups, reporting a daily average of 14. Figure 3, below, shows the average number of new registrations per day in Kitui, Murang'a and Kibera ranges from 2.7 to 4.5. The registration data are from Oct. 15, 2009, through Feb. 11, 2010.

M-PESA shop employees also reported that some customers, especially those that were conducting transactions at the maximum values, had registered multiple M-PESA accounts to increase the total amount of money they are able to transact. Some business owners that we interviewed for the study mentioned that the maximum transaction value on M-PESA is too low to be useful to them in conducting their business. There appears to be a demand for increasing the limits on transaction amounts.

FIGURE 3: AVERAGE DAILY NUMBER OF NEW REGISTRATIONS



Source: IRIS Center study

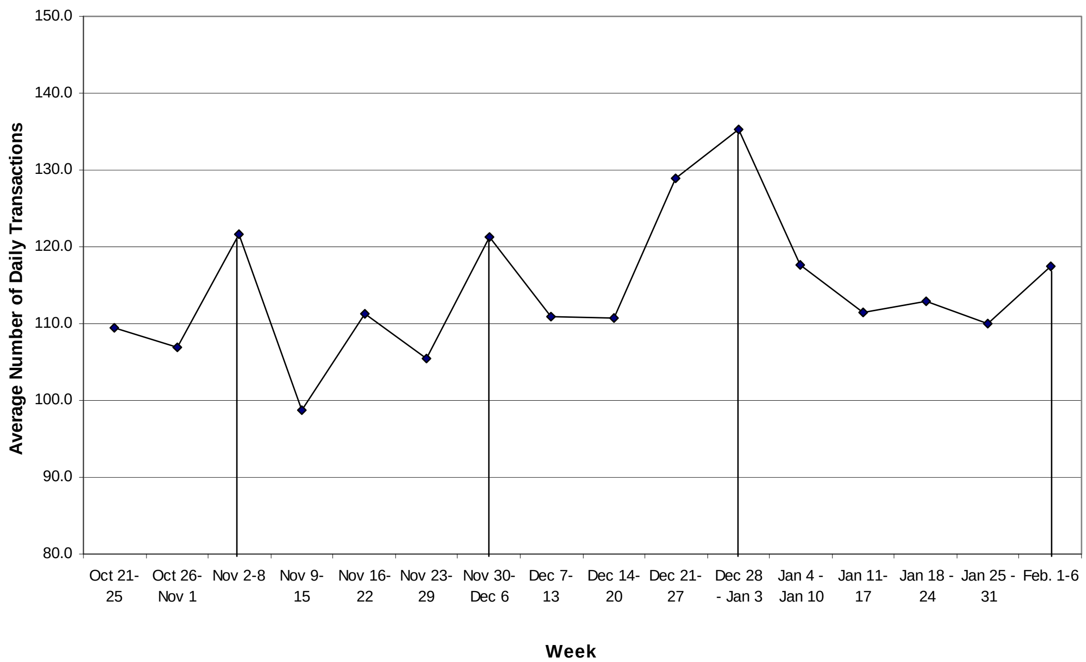
Fluctuations in Transactions Exist

One trend in M-PESA use found consistently across the study areas is a pattern of highs and lows in the number and size of transactions based on different days and weeks of the month. The middle of the month generally sees fewer M-PESA transactions, with an increase at the end and beginning of the month. The reason given for this pattern by the shop attendants is that, in general, people are paid their salary at the end of the month. Once they have cash in hand, M-PESA use increases. Recognizing theses patterns allows the shops to better prepare to be able to serve the customer as needed.

To illustrate the trend, we plotted (Figure 4) the weekly average of daily total transactions for one of the respondent shops in Murang'a town. Weeks that fall over the end or beginning of the month have a higher number of transactions. The M-PESA shopkeeper additionally noted that she saw business increase from the end of December 2009 through the beginning of January 2010. She attributed the higher volume to two factors: (i) The *matatus* (public transportation vans) went on strike, so people who were unable to travel sent money through M-PESA, and (ii) January marks the beginning of the school year, so many customers were paying school fees.

Many of the shopkeepers across the three study locations predicted an increase in the volume of M-PESA transactions in December due to the holiday season. A number also expected to see higher transactions in January due to school fee payment.

FIGURE 4: WEEKLY AVERAGE NUMBER OF TOTAL DAILY TRANSACTIONS: MURANG'A SHOP



Source: IRIS Center study. Data points for weeks falling over the end/start of the month are denoted with a line to the x-axis.

Another Murang'a town shop employee also noted that customers were both withdrawing and depositing for school fee funds. The attendant at another shop in town, however, felt that the school fees had the opposite effect on her business. Her shop is near a local college, and many of its customers are students. Because first term fees are high, she said, many parents use banks—not M-PESA—to send money orders.

Volume of Withdrawal Higher in Rural Locations

The three M-PESA shops in our study outside of towns (Wikililye, Katulani and Kambirwa) followed the trends reported in previous M-PESA research (Morawczynski and Pickens, 2009). Shop employees reported more female than male customers and much higher rates of withdrawals to deposits. In the rural small towns, reported shop data showed a high average number of withdrawals as a percentage of total daily transactions. Sustaining this level of withdrawal required receiving cash either from a trip to the bank or transfers from the owner of the shop at least once every two days, and often every day.

Table 2 shows the withdrawal share of daily total transactions in each of the rural shop locations and the average of the town and urban M-PESA shops. The effects of rural withdrawals in our study areas on local money circulation, food security and local business development, among others, are discussed in detail in Plyler, Haas, and Nagarajan (2010).

TABLE 2: SHARE OF WITHDRAWALS TO TOTAL TRANSACTIONS, BY STUDY LOCATIONS

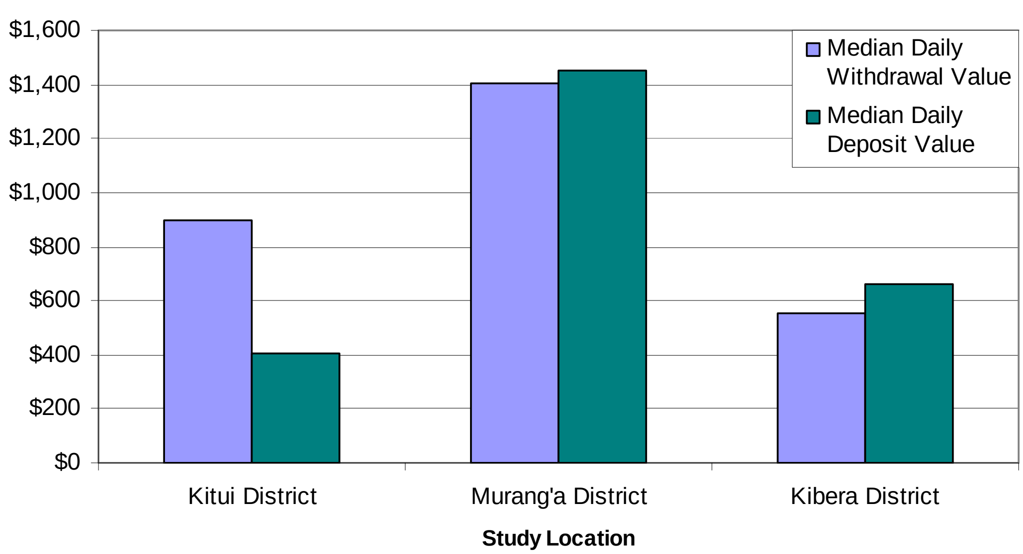
	Rural Kitui location 1	Rural Kitui location 2	Rural Murang'a	Kitui town shops	Murang'a town shops	Kibera shops (urban)
Number of shops	1	1	1	4	5	9
Average number of total transactions per day	70	86	51	134	80	90
Average of daily withdrawals to total transactions	80%	97%	82%	60%	58%	46%

Source: IRIS Center study

Total Value of Withdrawals and Deposits are Almost Similar in Urban and Large Rural Areas

Given that previous research has shown M-PESA is used predominantly by urban senders and rural receivers (Morawczynski and Pickens, 2009), one would expect to see this clearly represented in the total volume of withdrawals and deposits by location. Figure 5 shows the median value of the daily shop total withdrawal and total deposit amounts for each study location. [11]

FIGURE 5: MEDIAN DAILY WITHDRAWALS AND DEPOSITS (IN USD), BY STUDY LOCATION



Source: IRIS study

The trend Morawczynski and Pickens (2009) noticed held true for Kitui, the most rural of the three locations. Among the Murang'a district and urban Kibera participating stores, the difference between total withdrawal and deposit volume is much smaller, implying a better ability to manage the cash and e-float balances. Both show slightly higher deposit totals.

[11] The median, instead of average, is used here since there were fluctuations and variations within and among the shops.

Possible reasons for this trend include large proportions of M-PESA transfers occurring between residents of the same area and customers depositing and withdrawing their own funds. Also, it is possible that the total withdrawal and deposit amounts are similar due to limits on deposits and/or withdrawals imposed by the person managing the till to manage electronic float and cash thresholds. When a shop is running low on either cash or e-float it might limit the size of individual withdrawals or deposits in order to not completely run out.

Kitui shop manager on cash shortages: "We just serve the one's we are able to serve."

We also provide shop data on average daily total value of withdrawals and deposits in Table 3. Town Shop 4 in Kitui appeared as an outlier among the study participants, recording the highest volume of business in Kitui. We learned that the shop is a long-running store, near the banks, and also serves as the source of cash for some of the other M-PESA shops in the area.

TABLE 3: AVERAGE DAILY VOLUME OF WITHDRAWALS AND DEPOSITS, BY INDIVIDUAL SHOPS IN STUDY DISTRICTS

Kitui	Town shop 2	Town shop 3	Town shop 4	Rural shop 1	Rural shop 2
Average total withdrawal in $	628	393	8,968	896	1,347
Average total deposit in $	530	404	5,774	387	89

Murang'a	Town shop 1	Town shop 3	Town shop 4	Town shop 5	Town shop 6	Rural shop 1
Average total withdrawal in $	1,312	1,726	1,498	657	3,837	650
Average total deposit in $	1,249	1,756	1,653	630	3,203	152

Kibera	Shop 1	Shop 2	Shop 3	Shop 4	Shop 5	Shop 6	Shop 7	Shop 8	Shop 9
Average total withdrawal in $	806	279	478	1,090	452	548	593	555	963
Average total deposit in $	660	520	498	1,432	389	1,001	704	572	785

Source: IRIS Center study

C. FACTORS AFFECTING M-PESA OUTREACH

Cash and Electronic Float Shortages May Limit M-PESA Outreach

While cash shortage is a significant concern in rural settings, shortage of e-float was often reported in urban settings. In Kibera, whether or not the shop reported problems with shortages, all 10 respondents believed that other local M-PESA shops had e-float shortages. Respondents in Kitui town and Murang'a town also indicated e-float shortages of their own or perceptions of other shops having shortages. In Murang'a, low e-float was a more commonly reported problem than cash shortage.

> E-float shortage: When an M-PESA till has insufficient electronic money to satisfy customer requests to deposit.
>
> Cash shortage: When an M-PESA shop has insufficient cash on hand to satisfy customer withdrawal requests.

It was not uncommon for a person running the M-PESA till to mitigate this problem by limiting the size of withdrawals or deposits, depending on whether she or he was low on cash or e-float. In town, this may mean that a customer has to visit more than one M-PESA shop or come back at another time to conduct the full withdrawal or deposit. This increases the time spent conducting an M-PESA transaction and possibly the monetary cost of withdrawing (there are no fees to deposit) and affecting customer satisfaction.

Some respondents reported coping with shortages of e-float by taking the depositor's cash and information, and either waiting until the shop has enough e-float in the till to process the transaction, or taking the cash themselves to another M-PESA shop to conduct the transaction. This was reported by shop workers who have done it themselves, as well as ones who have had other M-PESA employees come to deposit for customers at their shop. This process is not approved by Safaricom. One of the shops discontinued participation due to closure, ostensibly for a similar reason. We were informed that a customer had deposited money during a network delay and returned to his work place. During this time, a Safaricom officer visited the shop, saw the incomplete transaction, and determined to shut down the shop's M-PESA business.

Jack and Suri (2009) found in their September 2008 survey only six percent of users reported delays in being able to deposit funds in M-PESA. Given the frequent low float reported by agents, as well as the network disruptions described below, we would not be surprised if this was now a more common occurrence.

Common Service Disruption can Affect Outreach

The most frequently cited cause of disruption to the standard M-PESA workday was Safaricom network problems. Network delays of a few minutes to hours were a source of irritation for customers and lost business for agents. During planned network maintenance, agents and customers would often receive an advanced warning of network outage. But, more often, the outages or delays were unannounced and the agents were not able to predict the length of the disruption. A Kibera M-PESA shop employee's comment on network delays suggests just how commonplace it has become: When asked if there had been any delays in the previous two weeks he responded, "Yes, of course," without hesitation. Agents reported that delays were more common in the mornings, and some noted a pattern of delays on weekends and at the end of the month, when shops see a higher volume of transactions.

If left unattended, cash and e-float shortages and network disruptions could potentially limit M-PESA's outreach in terms of volume and number of transactions, and may eventually put the sustainability of shops at risk.

Financial Institutions Collaborate with M-PESA

While one might expect bank branches and M-PESA to be competitors, many banks have decided to join them rather than try to beat them. Two of the banks visited as part of the study, as well as both SACCOs, had at least one M-PESA window. The other two banks visited, which did not function as M-PESA agents to the customers themselves, served as "super agents," dealing in cash and e-float with M-PESA shops. One of the MFIs said, across the country, some of its branches are "banking branches" with M-PESA windows. All of this particular MFI's branches will be converted to banking branches over the next few years, and therefore will be adding M-PESA windows.

Of the 12 organizations and branches spoken with, three had products that were tied to M-PESA, such as being able to transfer funds from a bank savings account to M-PESA and allowing deposits to personal savings through M-PESA. Four of those that are not using M-PESA stated they are considering tying into M-PESA, and one MFI was testing offering clients the ability to make loan payments through M-PESA.[12]

One MFI operating primarily in Kibera and the other Nairobi slums has integrated M-PESA in a less formal way. Rather than using M-PESA to directly deposit into the savings account or make a loan payment, clients could send the deposit or payment to one of the organization's officers, who would record the payment. The next time the client came in for a group meeting, she or he signed a record of the transaction. The director of the organization estimated that about three-quarters of its clients in Kibera have used M-PESA in this way. This organization prefers clients send payments through M-PESA, because this avoids people flocking to the branch in Kibera with cash, which poses a security risk.

Another MFI manager in Kitui mentioned that, although the MFI does not accept M-PESA for payment of loans, he knows that it is used within the MFI's savings and loan groups. Some groups have each member send her contribution through M-PESA prior to the group meeting. He believes this has improved their way of working, since each member can send her contribution regardless of her ability to physically attend the meeting.

One of the SACCOs spoken with had prepared to use M-PESA for loan repayment, but decided not to because of issues with tracking payments and receipts. The manager of the SACCO said customers had requested to use M-PESA with its products, and the organization had pursued this option with Safaricom. It prepared to offer loan repayment through M-PESA, but had too many concerns about reliable payment records to implement the program.

It appears that if M-PESA is able to offer a better tracking system for M-PESA transmissions, it may become more valuable to organizations and small businesses that require detailed transaction records. One hesitation on the part of financial organizations such as SACCOS and MFIs to integrate M-PESA into their payment system has been the lack of a reliable and verifiable system for tracking the sending and receiving of M-PESA transactions.

The need for an M-PESA-type service in conjunction with other banking services is apparent in the proximity of the various financial service providers. The manager of a Kibera MFI branch noted that, although the MFI does not use M-PESA or have an M-PESA window, a number of M-PESA shops have opened close to its branch locations. Clients who receive the MFI's loans can immediately transfer the cash to their phone for security and convenience. The desire of customers to be able to transfer funds between their phone and the bank has led to M-PESA shops opening in close proximity to banks, as well as led bank branches to open their own M-PESA windows.

Effective May 2010, the Central Bank of Kenya has modified the banking regulation to allow banks to use third party agents to deliver financial services on the bank's behalf. This could result in stronger partnerships between banks and M-PESA, thus improving outreach. Better services for customers could follow, allowing them access to a wider range of financial services without having to visit a bank in person. Such partnerships with banks and other financial service providers could also reduce the need for separate M-PESA shops. Increased compatibility with bank services could also encourage additional new registrations to M-PESA, increasing outreach. It remains to be seen whether that will outweigh the likely decrease in need to cash in or out e-float when conducting transactions with another financial institution. It is unlikely that agent banking by commercial banks will render M-PESA obsolete in the near future, as no single bank is likely to cover the Kenyan landscape as quickly as M-PESA has with its nearly 17,000 agent locations.

[12] In May 2010, Safaricom and Equity Bank announced the launch of a joint product, M-KESHO, an interest-bearing savings account coupled with M-PESA functionality which also offers micro-credit and micro-insurance. While this new product was introduced after the study time period, it will be interesting to see what effect it may have on financial inclusion in Kenya.

CONCLUSION

Our study results show the following:

- Who are the M-PESA agents?

We found that ambiguity exists in defining agents due to several layers of operators providing M-PESA services. In most cases, the person managing the till at an M-PESA shop on a day-to-day basis was a salaried employee. Most owners were successful business owners prior to their position with M-PESA and were primarily self-financed or used informal sources of finance for their entry into M-PESA.

- What are the recent trends related to the outreach of the agent-based M-PESA system?

M-PESA appears to have opened a means of basic financial services such as money transfers and bill payment to people who otherwise have not had access. In terms of the outreach of the M-PESA system, we found that access to M-PESA is expanding to interior areas, and more youth now tend to register with M-PESA. It is more accessible to people who are less educated due to few barriers to access the services.

In usage of M-PESA by its customers we saw evidence that:

1. The volume and number of transactions fluctuate based on the seasons and time of the month.
2. The volume of withdrawal is higher in rural locations compared to urban locations.
3. Within rural locations, women tend to be the primary customers and mainly withdraw funds.

The improved outreach seen in areas outside the urban and major town centers, among younger generations and women, and increase in volume of transactions is encouraging. Sustained outreach is important for attaining community-wide sustainable impacts from the presence and use of M-PESA.

- What factors are likely to affect the outreach of M-PESA?

Future outreach could potentially be affected by some bottlenecks. M-PESA shops frequently encounter cash and/or e-float shortages. Also, there is a perception that M-PESA's limits are too small to meet the needs of business owners. There is demand for M-PESA to increase the transaction maximums. The acknowledged difficulty in this, however, is seen in the number of shops that already have difficulty with shortages of e-float and/or cash given the current maximums on withdrawals and deposits. Increasing the transaction maximums could increase the shortage problems, or, in some cases, may not be available to all customers if shop workers impose lower maximums to avoid running low on cash or e-float.

The frequency and length of delays in the network system also impedes the reputation of M-PESA among its customers and adoption by non-users in the future. Given the growing competition from other providers offering similar services, M-PESA urgently needs to convince its customers that it will be there for them when needed.

While many financial providers are now collaborating with M-PESA for outreach purposes, there is a clear need to convince financial organizations such as SACCOS and MFIs to integrate M-PESA into their payment systems. The integration has been challenging due to inadequate system for tracking the sending and receiving of M-PESA transactions in real time.

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ANNEX 1: PARTICIPATING KEY INFORMANT INTERVIEWS: MICROFINANCE INSTITUTIONS AND OTHER FINANCIAL INSTITUTIONS

Organization	Position of Interviewee	Type	Location
Kenya Commercial Bank (KCB), Branch	Manager	Bank	Kitui
BIMAS, Branch	Regional Manager	MFI	Kitui
Faulu Kenya, Branch	Manager	MFI	Kitui
Lomoro	Founder and Director	MFI	Kibera
Jamii Bora, Branch	Branch Manager	MFI	Kibera
K-REP, Head Office	Customer Service and Product Development	Bank and provides MF services	Nairobi
Murata Farmers SACCO	Manager	SACCO	Murang'a
Equity Bank, Branch	Supervisor	Bank	Murang'a
Unidentified by Respondent's Request	Branch Manager	Bank	Murang'a
Kenya Women's Finance Trust (KWFT) Branch	Accounts Clerk	MFI	Murang'a
Teacher's SACCO	General Manager	SACCO	Murang'a
Kenya Commercial Bank (KCB), Branch	Branch Manager	Bank	Murang'a

ANNEX 2: SUMMARY OF RESEARCH TOOLS USED IN THE STUDY

Method	Tool Description	Participants	To Collect	Number
Case studies	Semi-structured individual interviews	M-PESA agents, sub-agents and a manager in Kibera, Kitui and Murang'a districts.	Collect information about local economy and M-PESA's place in it.	4 M-PESA agents; 2 M-PESA sub-agents; 1 M-PESA shop manager
M-PESA shop questionnaires	Structured initial and follow-up questionnaires	M-PESA shop operators	Collect information on general shop history and impressions on customer characteristics and use	25 initial interviews
M-PESA shop daily logs	Log sheets left with shop respondents to record daily summary transaction information. Retrieved approximately every 2 weeks	Self-reported by M-PESA shop employees	Collect summarized M-PESA use data by day	21 shops
Financial institution key informant interviews	Semi-structured individual interviews	Representatives of MFIs and banks in Kibera, Kitui and Murang'a districts.	Collect targeted information of M-PESA's effect on the local business environment	12 informants