

Designing Mobile Money Services

Lessons from M-PESA

M-PESA, the Kenyan mobile money service, has seen exceptional growth since its introduction in March 2007. Six million customers have registered with the service (see Figure 1), which represents nearly half the customer base of Safaricom, the mobile operator that launched M-PESA. This is a level of penetration in the mobile base that no other mobile phone-based service has achieved, outside of voice and text messaging. The figures for person-to-person (P2P) transfers are equally impressive: over USD 1.6 billion (120 billion Kenyan Shillings [KSh]) worth of such transfers have been made through the M-PESA system. Its agent network has grown in parallel with the customer base, and the service can be accessed at nearly nine thousand retail outlets nationwide, in both urban and rural areas.

M-PESA facilitates a variety of financial transactions through the mobile phone. To access its services, individuals must register at an authorized M-PESA retail agent outlet. They then get an individual electronic money account that is managed by Safaricom, which in turn deposits the full value its customers store in M-PESA accounts at a pooled account in a regulated bank. Thus, the issuer of M-PESA accounts is Safaricom, but the value in the accounts is entirely backed by highly liquid deposits at a commercial bank. Customers can use their mobile phones to transfer money to both registered and non-registered users, check their account balance, pay bills, purchase mobile phone credit, and transfer such credit to other users. They can also make deposits and withdraw cash from their M-PESA account by visiting an authorized M-PESA agent.

M-PESA is not the only mobile money service to be launched in Africa, but it is the most successful. For example, South Africa's WIZZIT has managed to attract 250,000 customers in more than four years of operation. Neighboring Tanzania launched its own version of M-PESA in April 2008, but it has only recently crossed the 100,000 customer mark. So why has this service grown so rapidly within the Kenyan context?

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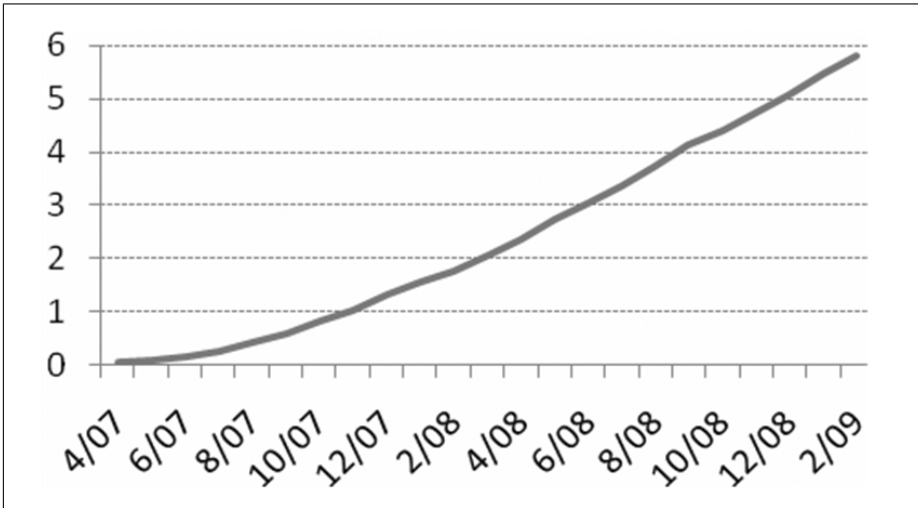


Figure 1. Growth of the M-PESA Customer Base.

A latent demand for money-transfer services has encouraged such growth. This demand is driven by the flow of rural-to-urban migration in Kenya. Because of the uneven structure of the Kenyan economy, it is common for a member of a rural household to seek employment in the city. In most cases, the male head of household migrates, while wives and children remain at home. Most urban migrants retain a strong attachment to their rural homes while residing in the city, which is exemplified most powerfully by their wish to retire to and be buried on their ancestral land. Several strategies help to maintain such relations, including regular home visits and frequent money transfers.

Poor alternatives for making domestic money transfers, particularly in the absence of technology-enabled or retail-based alternatives with a broad network of service points, also has fueled M-PESA's growth. The majority of low-income Kenyans use informal methods to send money home. Some give money to friends and family members traveling back to the rural area. Although this method is the cheapest, it may also be the riskiest, as some or all of the money could be lost along the way. Money is also traditionally transferred through bus and *matatu* (shared taxi) companies. These companies are not licensed to transfer money, thus there is considerable risk that the money will not reach its final destination. PostaPay, a money-transfer service offered by the post office, is another popular option. Although PostaPay has a presence in rural areas, many complain that the service is inefficient and frequent cash shortages are reported. Thus there was a significant gap in the domestic remittance market when M-PESA was introduced, and it had a significant role in filling this gap.

Safaricom's market dominance also has played a significant role in the success of M-PESA. Safaricom has a 77 percent market share in voice telephony, with a customer base of 13.3 million Kenyans. It has a strong brand presence, which plays

on nationalistic sentiments in its marketing campaigns. The company is also associated with people's concept of a modern Kenya, and it has made efforts to negatively portray nepotism, inefficiency, and corruption.

Due to Safaricom's size, it not only can offer the new mobile money service to a larger potential customer base, it also has a larger preexisting network of airtime resellers that could be converted to cash-in/cash-out points. Moreover, Safaricom is likely to be interested in customer retention schemes, which makes it easier to justify the business case for the mobile money service. Beyond these environmental factors, key service features also have facilitated rapid adoption and frequent use of M-PESA. Below we describe ten salient features.

GOOD SERVICE FEATURES OF M-PESA'S MONEY-TRANSFER SERVICE

Strong branding and simple messaging for an easy-to-use service

M-PESA has benefited directly from closely binding its product brand to Safaricom's strong corporate brand. Many M-PESA retail agents are required to display corporate branding, including painting the entire store "Safaricom green," which makes it much easier for customers to locate the service. Agents are asked to



become exclusive to Safaricom (not selling any products of other mobile operators), which gives the mobile operator greater control over the services provided. This is not required of airtime resellers who do not become M-PESA agents.

In Kenya, sending and receiving money with a mobile phone is not an intuitive idea for many people. It is important, therefore, that communications around how the service works and how it benefits users be simple and clear. From its inception, M-

PESA has been presented to the public as offering a simple service—"send money home." This basic remittance product has become the must-have "killer" application that continues to drive service take-up. M-PESA's marketing campaigns have worked well; most Kenyans queried know that M-PESA can be used for money transfers.

The simplicity of the message around the usefulness of the service has been matched by the simplicity of its usability. The M-PESA user interface is driven by an application that runs from the user's mobile phone. This has several advantages. The service can be launched right from the phone's menu, hence it is easy for users to find. The menu loads quickly because it resides on the phone and does not need to be downloaded from the network each time it is called. The menu prompts the user to provide all the necessary information, one piece at a time, based on the type of transaction requested. Once all the information is gathered, it is sent for processing through the air interface in a single text message. This reduces messaging

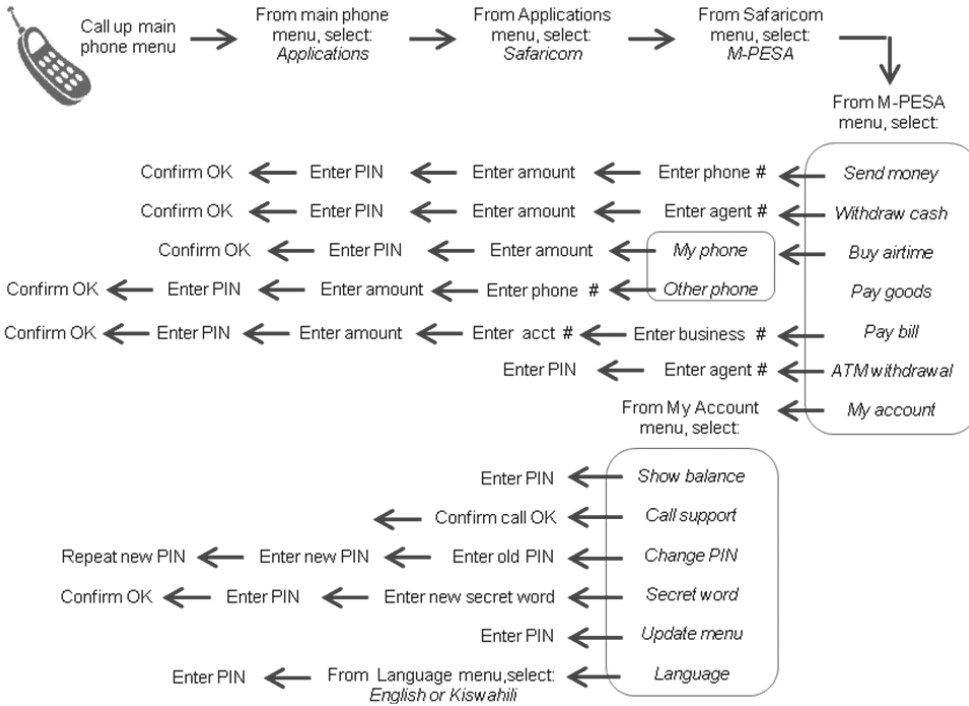


Figure 2. M-PESA Phone Menu Structure Used to Initiate Customer Transactions.

The pay goods item on the menu is at this point not being used. For cash withdrawals, retail agents and ATM networks have a special agent number which users can find posted at those locations. There is no menu item for depositing cash, as that is an agent-initiated transaction (the agent must send electronic value to the customer in return for receiving the customer's cash). The update menu item allows users to refresh their M-PESA phone application so that they can take advantage of the latest features.

costs, as well as the risk of the transaction request being interrupted half-way through. A final advantage is that the application can use the security keys in the user's SIM card to encrypt messages end-to-end. This begins from the user's handset and extends to Safaricom's authorizing entity. Figure 2 shows schematically the structure of the M-PESA user menu.

Frequent and consistent monitoring of retail agents

Safaricom's power over individual M-PESA agents extends well beyond branding and signage. Safaricom has maintained tight control of the M-PESA customer experience, even the portion delivered by its retail agents. This has helped to build trust in the platform and the agents, and gives customers a consistently positive view of the service. Safaricom manages its agent training programs, although they are executed by an outside company, rather than relying on agent aggregators or master agents to cascade these programs through participating retail shops.

Safaricom's territory managers monitor retail agents on a monthly basis with on-site visits. Each agent is rated on a variety of criteria, including visibility of

branding, agent number, and tariff poster; availability of cash and M-PESA electronic value to accommodate customer transactions, as well as replacement SIM cards for new customers; and the quality of record-keeping and processes followed (see examples below). In order to keep it simple, retail agents are scored on each item with either zero (deficient) or one (acceptable). No punitive measures are taken on the basis of these scores; the intent, rather, is to trigger appropriate conversations with the agent when something is not working well and to motivate the agents to make improvements.

Scalable agent distribution structure for liquidity management

Probably the single most important aspect that Safaricom needs to monitor is retail agents' availability of working capital—that is, having sufficient cash in the till to meet customer requests for cash withdrawals. It also means having sufficient value in the agent's M-PESA account to meet customer requests for cash deposits. If customers are unable to make transactions due to agents' lack of liquidity, the service will be less useful. This could lead to a deterioration of trust in the entire system, for if customers are denied access to their stored value, they cannot determine whether it is due to a specific agent's cash constraints or to a more fundamental breakdown in the system.

Safaricom relies on master agents to facilitate liquidity management. Most of these agents are Safaricom's own airtime resellers, but others include Group 4 Securicor, branches of Equity Bank, and some larger supermarket chains. Retail agents are attached to and managed by some three hundred master agents, who buy and sell M-PESA electronic value from the retail agents, thus giving the agents the means to balance their relative positions in M-PESA electronic value and cash on a day-to-day basis. This is usually done through the banking system. Master agents set up accounts in banks that have a presence near their retail agents, and the agents typically go daily to the nearest bank branch to either deposit or withdraw cash from their account. Transfers of money between retail agents' and the masteragents' bank accounts are then offset by opposite transfers of M-PESA electronic value. In other cases, the master agents physically pick up or deliver cash from retail agents, or ask the retail agent to do so at a nearby master agent office. Any cash physically exchanged between master and retail agents is directly offset by an opposite transfer of M-PESA electronic value.

At an aggregate level, master agents help to balance out the net cash requirements of the various agents under their management. In effect, they provide ways to move money from retail agents in areas with net cash in (i.e., they experience more deposits than withdrawals) to retail agents in areas with net cash out. Safaricom originally required each master agent to operate in at least two provinces to increase the likelihood that the net cash requirement would balance out at the master agent level.

Master agents either buy or sell M-PESA electronic value for cash directly from Safaricom, based on whether a group of retail agents they manage has a net cash-

in or cash-out position. Safaricom did not want to have to manage individual purchases and sales of M-PESA value for all its retail agents, so it does so instead through a limited group of master agents, who in turn “wholesale” M-PESA electronic value to individual agents. It reportedly takes as much as three days for master agents to retrieve the value of M-PESA balances they want to sell back to Safaricom. This long delay is in part a function of the relatively unsophisticated systems in place with Safaricom’s settlement bank, the Commercial Bank of Africa, and partly due to normal interbank settlement arrangements in Kenya. In return for these liquidity management services, master agents typically get around 30 percent of the total agent commissions paid by Safaricom, with the retail agents getting the remaining 70 percent.

Each master agent is also responsible for paying M-PESA commissions to the retail agents. To help the master agents manage agents’ liquidity and commissions, Safaricom provides a website where they can access information on all the transactions made by their agents. There are tools in the system that allow master agents to move “e-money” around among their own retail stores.

A tangible expression of the service: The agent log

Each transaction made using M-PESA is confirmed via an SMS from Safaricom to both transacting parties. The confirming SMS constitutes an electronic receipt, which can be used in dispute resolution. Two examples of SMS receipts are shown

in Figure 3. The receipt confirming a money transfer details the name and number of the recipient and the amount transferred. This allows the sender to confirm that the money was sent to the right person—a frequent source of error. The receipt also bears a unique transaction number and shows the current balance in the customer’s M-PESA account.

Some of the M-PESA users we talked to keep their SMS receipts on their phones, even months after conducting a transaction. Some explained that this helps them track their finances. Urban men, in particular, said they check the receipt to see when they last sent money home. Others said

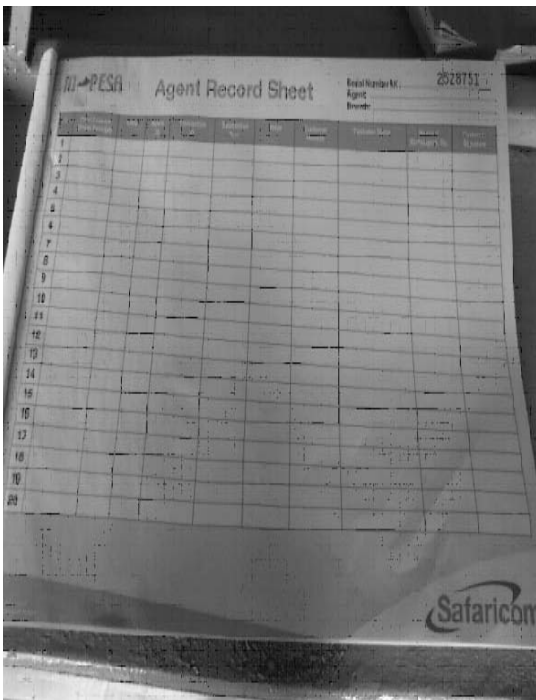




Figure 3. Confirmation SMS for Deposit (left) and Confirmation SMS for Money Transfer (right).

they keep it in case “issues” arise with their relatives so that they have evidence the transfer was made.

While the SMS receipt is the official confirmation of a transaction, it is elusive proof in the minds of many customers. This is especially the case with cash transactions at retail agents, where a third party is in some way mediating transactions between the customer and Safaricom. Safaricom takes the extra step of requiring agents to record all transactions they undertake in a paper-based log book. This log book is branded by Safaricom and all retail agents use the same format.

In fact, the consistency of the customer experience across all M-PESA retail agents and the degree of control Safaricom has over them is epitomized by the agent log. For each transaction, the agent enters the following information: the M-PESA balance, the date, agent ID, transaction ID, transaction type (customer deposit or withdrawal, agent cash rebalancing), value, customer phone number, customer name, and the customer’s national ID number. The bulk of this information is copied from the agent’s confirming SMS. Customers are then asked to sign the log for each transaction, which helps discourage fraud and also gives agents a way to offer first-line customer care for customers querying previous transactions.

Many customers draw comfort from seeing their electronic transaction recorded on paper. Many Kenyans are reluctant to hand over their cash, and some tell stories of losing money in pyramid schemes or fear that “fake” M-PESA agents could be operating. Thus the log is vitally important to agents in building rapport with their customers.

Each entry in the log is written in triplicate. The top copy is kept by the retail agent for his own records, a second is passed on to the master agent, and the third

is sent to Safaricom. It must be remembered that all the information contained in the agent log (except for the customer signature) is captured electronically by Safaricom at the time the transaction is made and is available to the master agents via their web management system. Hence, it is unlikely that they make direct use of their copies of the agent log.

Customer registration: Easy and quick for customers, rewarding for agents

Safaricom designed a quick and simple process for customer registration, which can be done at any retail agent location. Customers pay nothing to register and the

agent does most of the work during the process. First, the agent provides a paper registration form, where the customer enters their name, identity number (from Kenyan National ID, Passport, Military ID, Diplomatic ID or Alien ID), date of birth, occupation, and Safaricom phone number. The agent then checks the ID and inputs the customer's information from the registration form into their phone. If the customer's SIM card is an old one that is not preloaded with the M-PESA application, the agent replaces it; the customer's phone number is not changed even if the SIM card is. Both the customer and agent then

The image shows a paper registration form for M-PESA services. The form is titled "REGISTRATION FOR M-PESA SERVICES AND ACCEPTANCE OF CONDITIONS OF USE OF M-PESA SERVICES". It includes sections for "REGISTRATION PARTICULARS" (Name, Date of birth, Passport ID No., Type of ID, Nationality, Residential District, Occupation, Safaricom Mobile Number) and "CUSTOMER ACCEPTANCE" (I agree to pay the Tariffs, I confirm that I have a Safaricom SIM Card, I acknowledge receipt of a one-time secret Start Key). The form also has fields for "AGENT DETAILS" (Agent Name, Agent Outlet, Agent Assistant name & ID) and a signature line for the applicant. The form is numbered 8878671 at the top right.

receive an SMS confirming the transaction. The SMS gives customers a four-digit start key, which they use to activate their account. After the start key is entered, customers input their secret PIN and ID number, which completes the registration process. In addition to leading customers through this process, retail agents provide customers with information on the various ways to use the application, as well as transaction costs. Such agent support early in the process is particularly important in rural areas, where a significant percentage of the potential user base is illiterate or unfamiliar with the functioning of their mobile phone.

Agents are given incentives to register customers. Safaricom initially offered an up-front fee of KSh 80 (around USD 1.30 at the time the service was launched) per

matatu fare plus travel time). Withdrawal charges are “banded” (i.e., larger transactions incur a larger cost) so as not to discourage smaller transactions.

It is also noteworthy that M-PESA has maintained the same pricing for transactions in its first two years, despite the significant inflation experienced during the period. This has helped establish customer familiarity with the service. However, Safaricom has changed the pricing for two customer requests that do not involve a transaction: balance inquiries (because the initial low price generated an overly burdensome volume of requests) and PIN changes (because customers were far more likely to remember their PIN if the fee to change it was higher). The volume of both types of requests was brought down substantially after these price changes. As noted earlier, the SMS confirmation of a transaction contains the available balance, which also helps cut down on the number of balance inquiries.

Free deposits, no minimum balance

While the minimum deposit amount is KSh 100 (USD 1.25), there is no minimum balance requirement. Customers can deposit money for free, so there is no immediate barrier to taking up the service. M-PESA charges customers only for “doing something” with their money, such as making a transfer, withdrawal, or prepaid airtime purchase. But agents are rewarded for taking deposits in order to prevent them from both accepting withdrawal business and locating in communities with net cash-out requirements. In effect, Safaricom “advances” fees to agents at the time of customer deposits. For instance, on smaller transactions, the customer pays a KSh 25 (USD 0.30) fee to Safaricom on cash out, but Safaricom “splits” this between an agent commission of KSh 10 payable at the time of deposit and an agent commission of KSh 15 payable at the time of withdrawal.

Accepting free deposits does raise the risk that customers may circumvent the P2P transfer charge by depositing money straight into the recipient’s account. In order to protect its P2P revenue stream, Safaricom needs to ensure that its agents are checking their customers’ IDs so that customers deposit money strictly into their own accounts.

Ability to send money to non-customers

M-PESA customers can send money to non-registered mobile phone users on any phone network. Non-registered recipients get a code via SMS, which they can convert into cash by presenting it at any M-PESA retail agent. This capability enabled early adopters to use the system even when there were few other customers on M-PESA. It also created an incentive for customers sending money to convince recipients to register for the service.

The cost of sending money to non-M-PESA customers is designed to maximize customer growth. As shown in Figure 4, customers pay a higher (roughly triple) P2P charge when sending money to a non-customer than to a customer. On the other hand, non-customers can cash out the amount received for free, whereas registered customers pay a cash-out fee of at least KSh 25 (USD 0.30). So why

“penalize” the customer rather than the non-customer? Safaricom understood that the sender had power over the recipient, so it chose to put pressure on the sender to require the recipient to register with M-PESA. Furthermore, the non-customer got a great “first experience” with M-PESA when he received money for free, which Safaricom hoped would convince them to register for M-PESA. Safaricom’s plan to stimulate growth via the pricing structure worked well, as many rural cash recipients reported that their urban relatives, the senders, persuaded them to sign up with M-PESA.

Enabling ATM withdrawals

A year after its launch, M-PESA partnered with PesaPoint, one of the largest ATM service providers in Kenya. The PesaPoint network includes over 110 ATMs scattered all over the country, giving them a presence in all eight provinces. This partnership has given PesaPoint a new role—as an M-PESA agent. Customers can retrieve money from any of the PesaPoint ATMs by selecting “ATM withdrawal” from their M-PESA menu. After making this selection, customers receive a one-time ATM authorization code, which they use to make the withdrawal. No bank card is needed for this transaction.



The link with the extensive PesaPoint ATM network has given customers numerous benefits. First, money is more accessible, at least in urban areas. Customers can make withdrawals at any time of the day or night, which is not the case with M-PESA agents, who usually terminate operations before sunset because of security risks. Second, these ATMs also help to alleviate liquidity constraints. Because of cash float constraints, agents cannot always meet requests for withdrawals, especially large withdrawals. Furthermore, the agent commission structure discourages agents from handling large transactions. As a result, customers are forced to spread out their transactions over a few days, taking money out “in bits” rather than withdrawing a lump sum, adding both cost and inconvenience. It also undermines customer trust in M-PESA as a mechanism for high-balance, long-term saving. Using ATMs to give customers a sort of liquidity mechanism of last resort bolsters the credibility of the M-PESA system.

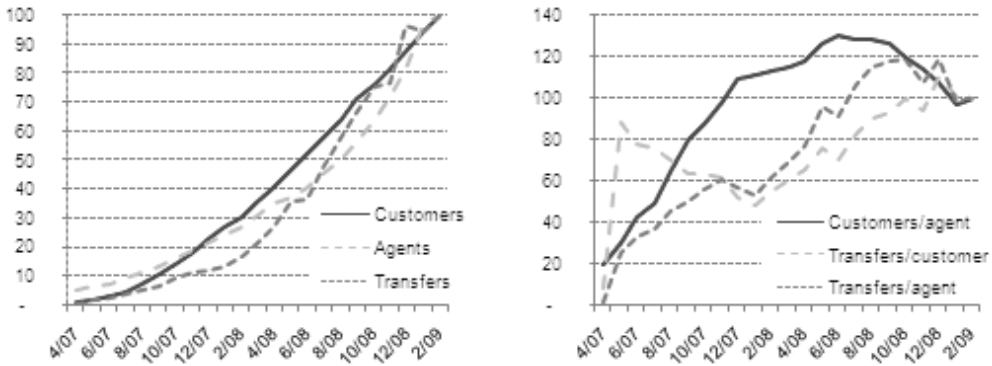


Figure 4. Monthly Growth in the Number of Registered Customers, Number of Authorized Retail Agents, and the Value of P2P Transfers (Index Numbers, February 2009=100).

Source: Safaricom.

Maintaining a balanced growth of customers and retail agents

Safaricom has maintained orderly growth in the number of agents it has relative to growth in the number of customers and number of transactions flowing through the system. The left side of Figure 4 shows the growth pattern of each of these three variables, while the right side shows the evolution of the key ratios between these variables. The growth shows index numbers, such that the data in each month for a given variable or ratio is expressed relative to its corresponding value in the last month for which data is available (i.e., February 2009=100).

These graphs show that the original impetus was customer growth, which outstripped growth in both the number of agents and transaction value for the first six months after launch. But after that, the number of customers per retail agent has roughly remained constant. The number of agents has been managed to maintain steadily growing profitability for them, as reflected by the generally increasing ratio of value of transfers per agent. Agent commissions are driven by the number of cash-in/cash-out transactions; assuming that a P2P transfer involves one cash-in and one cash-out transaction, the ratio of transfers per agent is a direct measure of trends in agent profitability.

While Safaricom considered the spread of the agent network the key to customer growth, it was careful not to flood the market with agents whose profitability could not be maintained or increased over time. This has resulted in an incentivized, committed agent base.

CONCLUSION

M-PESA's success cannot be boiled down to any one specific factor. In fact, it is consistency among all the elements of the customer proposition and Safaricom's

Could a service like M-PESA be a useful vehicle for savings?

While M-PESA was not originally conceived as a savings service, the system is sometimes used by people as a safe store of value. For unbanked customers, it may be their first experience with electronic forms of savings. Even for banked customers, it may play an important role in the savings portfolio of poor people—somewhere between the bank (used for larger, longer-term savings) and the home bank (used for day-to-day cash management).

M-PESA does have several shortcomings as a savings product. First, it does not pay interest. This has been a particular issue in the last year, when Kenya experienced double-digit inflation due to rising fuel and food prices. Second, it is not prudentially regulated by the Central Bank of Kenya. This has important implications for the way the service is promoted. Although Safaricom does not openly discourage using M-PESA for savings, it certainly does not encourage this type of use. Most customers had to find out on their own that money could be stored with M-PESA. Third, the M-PESA mobile money account is a purely transactional account without any kind of commitment savings features.

The savings value proposition cannot be improved until Safaricom, and the regulators, acknowledge that M-PESA is being used as a savings product. The mobile operator is in a very strategic position, as it has access to over six million Kenyans, a large number of whom are low income and underserved by Kenyan financial institutions. This means that Safaricom can play as significant a role in mobilizing community savings as it did in powering payments across the country. For this to occur, the company must focus on forming strategic partnerships with banks and other financial service providers.

attentive monitoring of the entire system that best explain its success. Moreover, M-PESA's managers understood from the beginning that the success of the system centered less on the optimal management of mobile network resources than on marshalling retail agents.¹ Customers needed to have a good experience at the cash-in/cash-out points, where the bulk of transactions took place. This meant establishing a sufficient physical retail presence, reminding customers that they were transacting with Safaricom at all times, ensuring that the retail agents had enough cash to meet customers' transaction requests, and, above all, motivating agents to promote the service.

This focus and determination were built up after a long and rigorous trial run. During the trial process, Safaricom's basic beliefs about the usefulness of the M-PESA service were shaken dramatically. Safaricom initially thought the service would be centered on microcredit repayments, but they reoriented it toward domestic remittances after monitoring transaction patterns during the pilot and assessing customer feedback. The feedback not only helped test the design of the service, it actually helped redefine its basic purpose. The crucial role played by

these test customers perhaps set the tone for a listening process that has served Safaricom well ever since.

Despite its stunning early success, M-PESA still has many ways it can develop further. Safaricom can build a more robust business ecosystem around M-PESA and promote its use more specifically to cater to periodic, structured transactions, such as salary distributions and bill payments. Although Safaricom has started this process by signing up with a leading electric utility for bill payment and with several organizations to facilitate salary and social payments, its partnership base needs to grow if it is to develop a robust ecosystem. M-PESA could play a much bigger role as a savings vehicle for poor people (see textbox on previous page). It also could adjust its pricing to open up a much larger market of microtransactions by reducing the minimum transaction size (currently KSh 100/USD 1.25) and by introducing lower-priced transactions for small withdrawals and person-to-person transfers, which currently are fairly expensive for amounts under KSh 800/USD 10.



The competitive environment is now changing significantly. In February 2009, the mobile operator Zain introduced its mobile money product, called Zap money. (See the picture showing the new colors of competition in Kenya, with side-by-side retail agents for M-PESA and Zap.) Zap is being advertised as a “mobile wallet”

rather than just a money-transfer service, and it provides numerous functions that M-PESA does not. For example, Zap customers can move money between their Zap wallets and their bank accounts. They can also use Zap to pay for their groceries at Nakumatt, one of the largest supermarket chains in Kenya. The most interesting difference is not in the functionality but in the fee structure. Unlike M-PESA, the cash-in/cash-out fees are recommended rather than set. This allows the customer to negotiate transaction fees with individual retail agents. If and how such flexibility will be valued by customers is yet to be seen.

Thus far, Zap’s growth rate has matched that of M-PESA. Over 200,000 customers have registered with the service since its launch (M-PESA registered nearly 256,000 customers in its first three months). Orange, the third mobile operator, is also planning to roll out a money-transfer product. It remains to be seen whether the new entrants can position themselves in an increasingly saturated market. It will be particularly interesting to monitor how M-PESA will alter its service features to compete in this newly competitive environment.

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¹ For a detailed account of the origins of M-PESA written by its creators, see Nick Hughes and Susie Lonie, "M-PESA: Mobile Money for the Unbanked," Special Edition of *Innovations* for the GSMA World Congress 2009, Spring 2009.