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***An Emerging Platform:
From Money Transfer System to
Mobile Money Ecosystem.***

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An Emerging Platform: From Money Transfer System to Mobile Money Ecosystem.

By Jake Kendall, Bill Maurer, Phillip Machoka, and Clara Veniard¹

Abstract

While it has often been described as a money transfer product, when mobile money reaches scale it can also be seen as a network infrastructure and platform facilitating the exchange of cash and electronic value between various economic actors including clients, businesses, the government, and financial service providers. In the past, the emergence of other network infrastructures that provide new ways of moving people, goods, energy or information (canals, railroads, electricity, telecommunications, internet, etc.) has had transformative effects on the economy. In this paper, we document what may be the early stages of just such a transformation in the market for retail financial services in Kenya, where the M-PESA mobile money product has achieved the scale necessary to form an infrastructure backbone to the financial system.

Our investigations uncovered significant integration of mobile money into the product and services offered by financial institutions in Kenya. We find an ecosystem of firms has sprung up to facilitate the technical integration of existing financial institutions' back end systems with the new mobile money platform. We also find a number of innovative new businesses and "pure play" startups which operate solely over the mobile money platform. That said, significant barriers remain which block the development of a more fully developed ecosystem including the high price of money transfers and the difficulty of integrating to the mobile money interfaces (especially that of M-PESA). Firms wishing to outsource their day-to-day cash transactions with clients to the mobile money system may face a new challenge, as they must find new opportunities for interactions with their clients to reinforce rapport, build trust, educate, and cross sell new products.

Mobile money as a network infrastructure & platform for financial services

In the past, the emergence of new network infrastructures (canals, railroads, electricity, telecommunications, internet, etc.) has had profound effects on the economy.² New ways of moving people and goods, energy, or information can lead to waves of innovation and have transformed markets as existing firms restructure and new firms emerge to capture new opportunities. While it has often been described as a money transfer product, mobile money is a network infrastructure for storing and moving money that facilitates the exchange of cash and electronic value between various actors including clients, businesses, the government, and financial service providers.

¹ Author affiliations: Jake Kendall and Clara Veniard, Bill & Melinda Gates Foundation; Bill Maurer, The Institute for Money Technology and Financial Inclusion; Phillip Machoka, United States International University, Nairobi. The views expressed herein should be considered the personal views of the authors alone and may not reflect the views of the Gates Foundation.

² Historians of technology have long noted the economic and social changes wrought by new infrastructure such as electrical power and rail. See Thomas P. Hughes (1993) *Networks of Power: Electrification in Western Society, 1880-1930*, Johns Hopkins University Press. For a cautionary tale, see Wolfgang Schivelbusch (1987), *The Railway Journey: The industrialization and perception of time and space*, University of California Press.

As with many other types of network infrastructure, mobile money displays the characteristics of a platform bringing together financial services providers and clients, and providing them a core functionality which they can use to transact, and which can be incorporated into different financial products.³ Platforms, such as the Internet, Facebook, iPods, smart phones, video game platforms, and financial and commercial exchanges, also have great power to stimulate innovation and change existing business models. As a network infrastructure, and as a platform for financial services innovation, mobile money appears to have the potential to radically reconfigure how retail finance is done in developing countries.

There are a number of fundamental challenges to reaching the poor with financial services that have blocked market growth in the past. Perhaps the key challenge is that the vast majority of the poor lives in a cash economy, and is *paid* in cash. In developed economies, banks usually receive clients' salaries via direct deposit and the money can either be moved to longer term savings products or withdrawn and spent through channels like ATMs and point of sale devices. In developing economies, the poor lose the natural connection to the financial system which stems from having income born in electronic form. They require a deposit taking infrastructure to even get them into the bank in the first place. To make matters worse, the poor often make money unpredictably and would need to deposit frequently whenever small windfalls come their way. Meanwhile, banks and other financial service providers are loath to deploy deposit taking banking infrastructure (i.e. branches, and two way ATMs) as intensively as they might need to in order to service poor clients' greater deposit needs since the revenue these clients generate does not justify the investment. In fact, even clients who do not require intensive deposit services (e.g. those who might receive direct government transfers or military pensions) are rarely seen as profitable customers by banks given the low balances they hold and the high transaction cost of traditional banking infrastructure.

Mobile money appears to have the potential to solve many of these issues. By giving banks and other financial services providers a cheap way to outsource cash handling and deposit and withdrawal transactions, mobile money can allow providers to serve clients at lower cost per transaction and with a reduced investment in physical infrastructure. Additionally, by unbundling and outsourcing transaction handling, banks may be able to get more value out of their existing branches and branch staff, refocusing them on more value-adding and complex tasks such as wealth and risk management advisory services and cross-selling products. Mobile money also helps clients by giving them a dense network of transaction outlets where they work and live, reducing the cost to clients of accessing financial services. Once clients are on the financial system and able to transact at low cost with banks and other financial service providers, the platform enables a new set of services and delivery models which were not previously possible or profitable for the provider.

Mobile Money Players in Kenya. In addition to Safaricom's M-PESA, other mobile operators in Kenya have launched similar mobile money services during the past two years, including Yu (YuCash), Orange (Orange Money), and Zain (Zap). However, M-PESA remains the most widely used mobile money service and is the focus of our study.

The financial inclusion field's excitement for mobile money is driven by the possibility of providers offering savings, credit, insurance and other products to the poor at low cost. But whether mobile money will achieve this lofty vision depends on a number of factors.

³ Economists often refer to mechanisms which brings together multi-sided markets as a platform. Multi-sided markets are those where each side benefits, the more the other sides participate. An example would be video game consoles which bring together game players and game producers and where players benefit from a wider variety of game producers and game producers earn more when there are more players.

First and foremost, networks and platforms usually require scale to have significant impact. Second, even if mobile money reaches the poor, other barriers might inhibit innovation in financial services for this segment. Finally, mobile money may simply not lower clients' and providers' costs enough to be truly transformative.

In Kenya, Safaricom's M-PESA has managed to overcome the "last mile problem" creating a network that connects over 70% of Kenyan households to the financial system (13.3m people, approximately 60% of all adults in Kenya).⁴ The M-PESA network handles more transactions in a year than Western Union does globally, and the value of transactions represents more than 15% of Kenya's GDP.

Unlike other deployments around the world struggling to achieve scale, penetration is no longer the barrier limiting the platform's benefits. Nevertheless, having launched only in 2007 M-PESA is still in its early stages and, while the uptake of M-PESA has been spectacular, it is not yet clear what will be the final effect on the wider retail market or on the number of poor people who access the financial system. Some in the financial inclusion field suggest there is an "innovation gap" and M-PESA is failing to live up to the original promise but it is too early to tell whether innovation is not there or is still gaining momentum as the market comes to grips with a new way of doing business.⁵ It is also too early to tell who will drive innovation—will it be M-PESA or new and existing players riding on top of M-PESA? If others build products and platforms on top of the M-PESA platform, the innovation possibilities will expand greatly.

In this paper, we present the results of some initial probes to understand how market players are harnessing M-PESA as a platform for new services, and to gauge the emerging ecosystem of these M-PESA enabled services.

We looked both for existing financial institutions that are integrating M-PESA into their service offerings and for startups and new ventures that are launching new "pure play" services which operate primarily through the M-PESA platform. In addition to a basic landscaping to measure the level of activity in the space, we also sought to understand some of the motivations for using mobile money in a new wave of financial services delivery and some of the challenges these new and existing financial service providers face in doing so. We conducted the landscaping through Internet research and phone calls, and then had a mini-conference in Nairobi on January 14th, 2011, bringing together some financial service providers and information technology service firms who have begun to specialize in M-PESA product integration.

We also incorporate results from a recent study conducted by Microsave for the Bill & Melinda Gates Foundation which assesses new mobile money enabled products and services using information available from desk research, interviews with the implementers and users, secret shoppers, and focus groups.

Our investigations document significant integration of mobile money into the product and services offered by preexisting financial institutions in Kenya. We find numerous technology firms has sprung up to facilitate these integrations between financial service providers' back end systems and new mobile money platforms. We also find a number of innovative new businesses and "pure play" startups which have created financial services offerings operating solely over mobile money. Both those institutions integrating to existing products and those launching new ones frequently cite increased outreach and lower costs, especially in reaching poor clients, as motivations for adopting the mobile money platform.

⁴ For more on the history of the M-PESA products see Mas and Radcliffe (2010) and for more on the mechanics of how M-PESA's retail network works, see Eijkman, Kendall, and Mas (2010)

⁵ <http://technology.cgap.org/2010/03/08/mobile-money-takes-off-where-is-the-innovation-in-product-design/>

That said, significant barriers remain which block the development of a fully developed ecosystem including the high price of person-to-person (P2P) transfers and the difficulty of integrating to the M-PESA Application Programming Interfaces (APIs—see box for an explanation). From our conversations with providers, we also infer that those wishing to outsource their day-to-day cash transactions with clients may face a new challenge, as they must find new opportunities for interactions with their clients to reinforce rapport, build trust, educate, and cross sell new products.

Market Activity in Broad Strokes

Even though we were not able to conduct a complete census of the market, our search identified over 300 formal businesses which are integrated with M-PESA and other mobile money services. All of these businesses are large enough and formal enough to have a web presence. We did not seek to assess whether smaller or informal businesses are using M-PESA, though many also appear to be doing so. Further, we found almost 90 formal financial institutions which have integrated their operations with mobile money (primarily M-PESA) and found few providers who do not have mobile money integrations completed or underway. Financial service providers range from traditional banks, savings and credit cooperatives (SACCOs), and insurance providers to newer mobile-based credit, insurance and mobile savings offerings. A sampling of those offering new mobile money based services or products is contained in the appendix table.

Many of these integration efforts and products are still at an early stage and some of the new products have very few active customers. More detail on the market activity we found follows.

Landscape of “innovators”, “integrators”, and “bridge builders”

In order to develop a shorthand, we call financial services providers “integrators” when they add mobile money as a service delivery channel for an existing line of products, and “innovators” when they are new entrepreneurial products or ventures launched around a purely mobile money based business model. We call “bridge builders” application developers that specialize in mobile money integrations for financial and payment services.

Integrators

Most financial service providers in Kenya are joining mobile money platforms as a channel for their clients to make deposits and withdrawals from bank accounts and other financial products. Financial service providers integrate with mobile money platforms using a variety of mechanisms that vary depending on the institution. These linkages are often difficult and expensive to create and many providers we spoke to are wrestling with the process. In our analysis below, we focus on M-PESA since it is by far the dominant platform, although other mobile money providers exist.

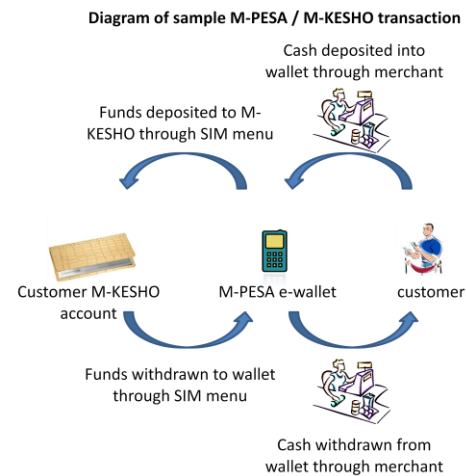
No official API exists that service providers can use to integrate to M-PESA. With the exception of the M-KESHO product described below, financial service providers typically adapt two different one-way mechanisms to move money to and from clients. M-PESA’s Pay Bill function allows clients to send deposits from their M-PESA account to the financial service provider while most providers use custom

Application Programming Interfaces

(APIs) are sets of instructions that allow different software applications to interface with one another. Well designed APIs are powerful because they allow the development of new applications that seamlessly incorporate the functionality of the original system into their workings. APIs are a recent innovation: their origin is in TCP/IP network architecture, but their use for user-oriented application development dates to the mid-1990s. The invention of M-PESA corresponds in time to the explosion of interest in APIs for third-party application development, itself propelled by the mobile revolution, so it can hardly be blamed for having a poor API (PayPal, for example, launched APIs in 2010).

built “screen scraping” programs to connect to M-PESA’s bulk payments webpage to automate the sending of large numbers of withdrawals. Banks also have the option avoid the bulk pay “screen scraping” for withdrawals by instead using a SIM card which is activated directly by the Bank’s server. However, these integrated SIM cards are extremely slow and not suitable for sending more than a few dozen transfers per minute so are rarely used. In some cases, financial service providers opt to use a third party “middleware” software application to facilitate easier integration with M-PESA, though these also use the bill pay and bulk payments channels to activate payments.

On the client end, most providers present clients with two different interfaces for deposits and withdrawals. Deposits are done through the normal Bill Pay option in the M-PESA menu on their phone. Then clients must use a USSD based interface (described below) which allows them to trigger withdrawals to their M-PESA account. Here we describe how some of the integrations work.



M-KESHO link with M-PESA. Equity Bank, with over 6 million bank accounts constituting 55% of all bank accounts in Kenya, is perhaps the most active in the mobile money space and has the strongest link with M-PESA. In May 2010, Equity partnered with Safaricom to launch the M-KESHO product. M-KESHO is the first bank product with a real-time link to M-PESA for deposits and withdrawals via an easy to use SIM-based menu. It is branded by both Equity Bank and M-PESA and can be opened directly at an M-PESA agent. The two main differentiators of the M-KESHO product over others is that both deposits and withdrawals can be initiated through the SIM based menu as opposed to relying on the less user-friendly USSD menu. Additionally, and perhaps more importantly, the product was marketed and branded as a joint effort, which probably boosted initial uptake substantially.⁶⁶ In November of 2010 Equity partnered with Orange and launched its own mobile money product to try and increase competition with M-PESA. Along with the cash merchant network Orange plans to develop, Equity will launch its own cash merchants further increasing customers’ access to financial services through mobile money.

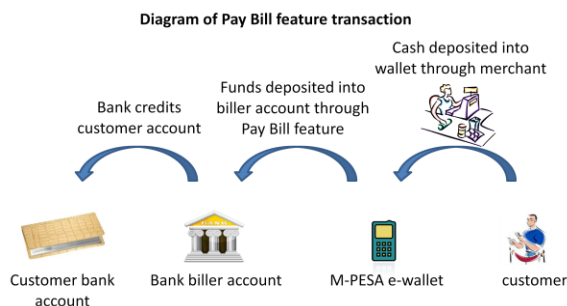
Except for Equity Bank, no other financial services provider has managed to integrate directly with M-PESA. For the others, no formal interface exists and they are forced to adapt the Pay Bill function to facilitate deposits and the bulk payments web menu for withdrawals as described below.

Deposits through the Pay Bill Feature. Pay Bill can be accessed from the M-PESA SIM menu and allows customers to deposit money from M-PESA to their bank account, although they are not able to withdraw funds. The customer experience is similar to paying a bill: she selects Pay Bill, enters the short-code for the recipient (which M-PESA calls a “business number”) as well as her own account number (as she would e.g. with a client account number at the power company). This directs a transfer to be made

⁶⁶ It’s not clear whether this interest will be sustained however, as the rate of uptake slowed significantly after the product launch. There were approximately 600,000 accounts opened in the few months after launch in may 2010, but the rate of activations dropped dramatically in the fall of 2010. The high prices of deposits and withdrawals, and difficulties in the relationship between Equity and Safaricom have contributed to the stagnant growth of the product.

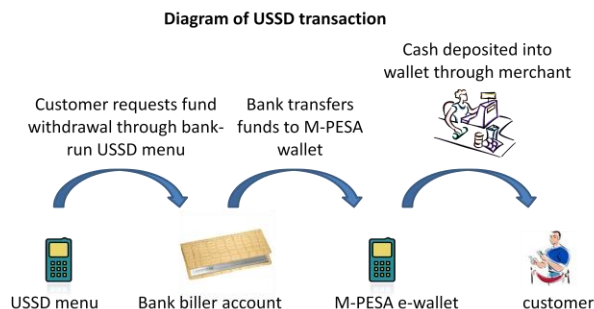
from her electronic wallet to the bank's biller account. Most banks allow deposits through the Pay Bill channel, even if they have not yet managed to facilitate withdrawals through M-PESA.

The Bill Pay feature can also be used to connect to other financial accounts. Kenya Women Finance Trust (KWFT) bank, for example, is a microfinance institution which leverages M-PESA's Bill Pay feature to enable customer loan repayments. The CIC Insurance Company uses M-PESA's Pay Bill to allow a customer to pay insurance premiums using a mobile phone. Customers can save Kshs. 140 (US\$1.75) every seven days, earn interest, and access an immediate life insurance cover of Kshs. 50,000 (US\$625) which increases to Kshs. 100,000 (US\$1350) by the twelfth year. The company absorbs the remittance charges that M-PESA places on Pay Bill transactions.



Withdrawals using bulk pay and USSD. A subset of financial institutions enable customer transactions through M-PESA in the other direction (ie. withdrawals) using a bank-run USSD menu. Institutions pursuing this approach include Barclays Bank of Kenya, Kenya Commercial Bank, Co-operative Bank, NIC Bank, Family Bank, K-rep Bank, Kenya Post Office Savings Bank, and Faulu Kenya. In order to process the withdrawal, customers have to link to their bank's m-banking platform by dialing a USSD code (for example "*498#" for Kenya Post Office Savings Bank). Funds are then transferred from the bank account to Safaricom and into the customer's M-PESA wallet. Once the funds are deposited into the wallet, the customer receives a message that funds are available.

Banks typically automate the high volume of withdrawals using M-PESA's web based interface for bulk payments. Since this web interface is designed to be used manually and no API exists to integrate to this page, financial institutions typically write a custom built "screenscraping" application. This application manipulates the web page like a real user uploading payments in real or near real time and sends them to clients who have requested a withdrawal. Screenscraping techniques are notoriously unstable and many providers have had their interfaces break down in the past when Safaricom has made even minor changes to the web interface.



Neither the Pay Bill deposits nor the bulk payments withdrawals need to be real-time because the bank does not have to credit the client account immediately. Instead, providers typically send the bulk pay transactions in a batch on a set frequency (most do it every few minutes, however).

Leveraging bridge builders. Some financial institutions also leverage bridge builders to facilitate connections with M-PESA, either by building custom applications to facilitate integration, or by offering middleware applications that automate the integration process for multiple smaller institutions. For example, Meru Mwalimu SACCO integrated its products with the M-PESA platform through Spotcash, a service that allows members of SACCOs and microfinance institutions to withdraw and deposit their money from and to their savings account respectively, through SMS, USSD, IVR or WAP. Once the

withdrawal request has been received, the money is transferred to the member's M-PESA account. The cost is 10 Kshs. per transaction (US\$0.12), without including SACCO fees or Safaricom withdrawal fees. Another example is Celulant which has developed integration solutions for many banks, including a platform for the World Council of Credit Unions that will enable SACCO's to connect with M-PESA.

Innovators

Innovators are new entrepreneurial ventures or products with a purely mobile money based business model for financial services.⁷ They fall into two categories: existing providers developing new types of products that only operate through the mobile money channel and new entrepreneurial ventures launched around mobile money based products. In both cases, the new products facilitate transactions through the mobile phone and mobile money agents rather than through legacy channels like retail bank outlets, or sending money by check or money order. Savings and insurance seem to be particularly popular financial products in this space, probably as a result of the need for frequent, small value transactions that would be expensive to facilitate through normal retail channels - both for clients who would have to travel further, and for institutions who would have to maintain a retail channel.

Examples of innovators. Our research uncovered a number of newly launched savings, credit, and insurance products where mobile money is integral to their delivery model. These products run on the mobile money platform and help low income Kenyans save for retirement, health care and other needs, borrow; or open small value insurance contracts. Many are targeted at customers who do not have steady incomes and cannot afford to make regular lump sum monthly payments and appreciate a service that allows them to make small value payments. A few sample products include:

- Zimele asset management offers a new pension scheme where clients can remit a deposit of as little as Kshs. 250 (US \$3.13) on a regular basis via the Pay Bill feature and earn interest at a rate of 8.5% quarterly. Zimele started this in late 2008 and claims it is getting a good response by depositors who want to avoid traveling to the head office to pay installments.
- The Jua Kali Association (an association of self employed informal workers) offers a new pension product with can be funded through mobile money, including M-PESA. Users can save for retirement via the Pay Bill feature starting at Kshs. 20 (US \$0.24). This product has allowed Jua Kali to more than double the number of pension accounts in only six months.
- Changamka Microhealth Ltd., offers a medical saving plan for out-patient and maternity health care for expectant mothers. Customers use M-PESA's Bill Pay function to save small contributions to a smart card where the money is locked-in for use when one falls ill or needs maternity care. In selected clinics, customers can pay for medical services at a discounted rate using the smart card. Contributions to the smart card can also be made via M-PESA from family members, friends, and other community members.
- UAP insurance company partnered with the Syngenta Foundation for Sustainable Agriculture and Safaricom to help farmers insure against drought when they buy certified seeds and fertilizers through a program called Kilimo Salama (Safe farming). This scheme offers a micro-insurance policy to small-scale farm holders who plant on as little as one acre that covers them from financial losses during drought or excess rain. Dealers are equipped with a camera phone that scans a bar code at the time of purchase and immediately registers the policy with UAP

⁷ Most of the innovators link to M-PESA using one or more of the integration options outlined in the integrators section.

Insurance through Safaricom. An SMS confirming the insurance policy is sent to the farmer through the mobile phone. When data is transmitted through the Safaricom network from a particular weather station indicating that extreme weather conditions are going to cause crop failure, all the farmers within the region of that station automatically receive a payout via M-PESA. In September 2010, rain shortfall in the Embu region allowed over 100 farmers to receive an insurance payment via M-PESA. This was the first crop insurance claim to be paid through a mobile payment system.

- M-PESA has also enabled the launch of entirely new service providers, including a virtual microfinance institution named Musoni. Musoni only offers credit services (although they hope to provide deposit services in the future) and all operations are cash free, with disbursements and repayments done through M-PESA's Pay Bill feature. In addition, Musoni has developed a server that creates reports based on data provided by Safaricom and that facilitates lending operations. Musoni customers are not charged for repaying through M-PESA or for the loan disbursement through M-PESA. The customer is only responsible for paying the cash-out fee from the M-PESA wallet.

Bridge-builders

As financial service providers and other businesses struggle to integrate with M-PESA, a mini-industry of software developers and integrators has started to specialize in M-PESA platform integration. A number have also built and begun marketing their own middleware applications which usually specialize in facilitating certain types of integrations. These bridge builders fall into two broad categories: 1) those that are strengthening M-PESA's connections with financial institutions for the delivery of financial products, and 2) those that are strengthening M-PESA's ability to interoperate with other mobile and online payment systems. The lack of functional M-PESA API is hindering bridge-building, but several companies have devised tools for new financial functions and online payments nonetheless.

Connectors with Financial Service Providers. A number of technology companies are facilitating mobile money's connections with financial institutions, especially small financial institutions struggling to integrate with M-PESA. Tangazaletu is developing a set of tools to integrate financial systems to M-PESA through an application called Spotcash that allows members of SACCOs and microfinance institutions to deposit and withdraw money to and from their savings account, through the Pay Bill or a USSD menu at a cost of 10 Kshs. per transaction (US\$0.12). A number of other providers are building or offering similar connections to M-PESA for small financial institutions, such as Kopo Kopo and Coretech Systems. Zege Technologies has developed an M-PESA integration, automation and aggregation solution called MPAYER that eases the process of frequent payments to and from M-PESA by processing payments on demand. Currently, Pay Bill transactions are processed in batches at scheduled times through a manual process, thereby causing delays and resulting in errors.

Connectors with other Mobile and Online Payments. Other technology companies are strengthening mobile money's ability to interoperate with online payment systems. Webtribe's Jambopay, Symbiotics' Moca, Intrepid Data System's iPay, and Pespal are a few examples of payment services that allow buyers to pay for goods and services over the Internet using their phone.

We found mention of over 20 companies which were performing these types of integrations or writing their own middle-ware applications to facilitate such integrations. Though not all of them operate in the financial services space, a significant number are, presenting strong evidence that there is sustained demand from financial services players to adopt the mobile money platform.

Motivations for adoption and perceived benefits from mobile money

In surveying the landscape of financial service providers who are harnessing the mobile money platform and the software development firms who are facilitating integrations, a few common themes emerge. Providers state a number of different reasons to adopt mobile money, most of them related to expanding geographic outreach and facilitating payments more cheaply. Some benefits mainly accrue to clients, and some to suppliers, but there are also several mutually beneficial features of mobile money integrations.

From the client perspective, integrating with mobile money increases the density of access points and the reach of access points in new areas, transforming the geographical distribution of delivery channels. Many financial service providers cite the lower cost in time and money for clients who want to make payments and deposits or receive insurance payments, withdrawals, or loan disbursements. Smaller institutions in particular lack widespread distribution networks (some have only a single branch) and thus can benefit from plugging into a ubiquitous, low cost retail delivery channel. Some institutions also report that the existing ATM network is not well situated for the poor. For example Nayndarua Teachers SACCO notes that ATMs are clustered around wealthier and urban areas far away from their low income and rural clientele.

Providers may also benefit from behavioral and other benefits. Savings clubs can have more efficient meetings because less time is devoted to handling and counting cash. More time can be spent meeting as opposed to counting the money that members brought in for payments.⁸ In addition, because the mobile money platform provides real-time remittance transactions and feedback (including instant SMS receipts), it can help build trust and promote savings and repayment behavior. There may be additional benefits to clients to having all their financial relationships and transactions available through a unified interface which is with them at all times – i.e. their mobile phone.

From the supplier perspective, there are a number of benefits afforded by the reduced need to deal with physical cash. Several providers suggest that keeping money in electronic form with clear records of every transaction is valuable to reducing the risk of theft and misappropriation by employees. Providers are also able to save on cash handling and collection costs. By removing the need to keep retail locations and field agents stocked with physical cash, many costs and risks are removed both for savings and lending operations. For example, with its purely mobile based business model, Musoni hopes to maintain very low cost operations. This not only reduces costs for the provider, it can also enable previously unprofitable small value transactions (although M-PESA's transaction fees are still too high to generate this benefit significantly).

Not having to handle cash also frees up staff time to focus on sales and other important tasks. This is especially valuable for smaller financial institutions, like SACCOs and other small financial services who value individualized sales and customer service for low income customer segments (through their closer connection with this client base) but that are poor at service delivery.

Challenges providers face integrating with mobile money in Kenya

Many providers report that building mobile money into new and existing products posed challenges at all levels from the operational to the strategic. The most common complaints are:

⁸ Anecdotally, practitioners report that monthly savings group meetings can be hours long and much of the time is taken up by publicly counting cash to verify records and bookkeeping are accurate.

Cost of transactions is the main barrier to integration with mobile money, especially M-PESA. The high cost of M-PESA transactions, which can amount to more than US \$1.00 for a roundtrip deposit and withdrawal transaction (though clients and institutions usually split this cost in some way), are a significant barrier for offerings where frequent small payments are necessary. Providers are excited about the ability of M-PESA to facilitate low value transactions -- many of the innovative products linking to M-PESA allow very small transactions -- but M-PESA's fees are still too high to be viable for the client, especially the person to person fee which is over US\$0.40. Many providers cite this as a key barrier to reaching lower income clients who would prefer to risk storing the money at home or saving through other informal means rather than pay these fees. As a result, some providers, such as Kenya Bankers Sacco Society, Musoni, and Zimele Asset Management, cover all or a portion of the fees charged by M-PESA. Although M-PESA transaction fees were cost effective when building the business, especially when compared with traditional retail channels, they are limiting the viability of smaller value transactions and thus limiting outreach to the poor. With Equity bank/Orange entering the market and Airtel Mobile money currently re-launching the ZAP product, Safaricom may eventually face some pressure to reduce pricing on transfers.

Integration costs and poorly performing M-PESA APIs are a key challenge. An equally common complaint is that integrating with mobile money is difficult and M-PESA has no real API to speak of. As detailed above, most providers have to hack together a system whereby clients access a session-based phone menu (USSD) to enable withdrawals via the web interface and use M-PESA's Bill Pay function to send money back the other way. Neither mechanism is optimized for the tasks they are performing and the Bill Pay function actually requires most financial service providers to have a custom integration to collect client data, link it to information received from M-PESA and input both sets of information directly into their back end systems. The poor API functionality causes many institutions to incur large integration costs, and suffer from poor performance and system downtime whenever Safaricom's interfaces change.⁹ This is especially problematic for smaller institutions with limited in-house software development capability and whose lower scale of operations combined with often older (or even Excel spreadsheet based) back end systems make integration a challenge.

While M-PESA's API was considered the worst, other mobile money APIs in Kenya are not much better. Yu-cash is lauded as having the best API, though its extremely limited agent footprint and client base make it of little use to banks seeking to reach the mass market.

Challenges of building and maintaining relationships with clients when offering a service indirectly.

While low levels of client literacy, lack of familiarity with technology, and limited exposure to financial products are challenges many financial institutions cite in dealing with the poor, these are exacerbated when mobile money is used as it implies less face to face contact with clients. As a result, the large cost savings to banks and to clients from having fewer transactions at the teller come at the expense of reduced client contact. This may make client outreach, trust-building, education, and cross selling more challenging, especially for providers that do not have brand recognition. Mamakiba, for example, is an early stage venture that offers pre-paid prenatal care and child delivery services to allow mothers to save for births rather than borrow. Given the lack of face to face contact and unknown brand, clients

⁹ We feel there are two main features of a "good" API: predictability of API management from the provider, and ease of use (which may or may not be related to degree of openness or adherence to industry standards – a user-friendly API might still be a walled garden or adhere to its own set of standards, for example). It is hard to program when the system might change without warning, and when the system is not designed to be open to third-party programmers. Safaricom has no formal API management process and when changes are made to the interface, financial institutions are left scrambling to fix them, regularly leaving their systems down for up to days at a time.

were at first skeptical that the services would actually be available when they were ready to give birth. Mamakiba had to counterbalance this with extra client outreach to establish trust.

We believe reduced direct client contact is a fundamental challenge that is created by the efficiency-enhancing separation of the cash transaction service function from the customer service and sales business functions. These functions used to be combined in one retail outlet where they overlapped, facilitating client contact and client relationship management whenever someone came in to deposit or withdraw cash. Now they are separated, challenging providers to develop new models for fostering positive interactions with customers. One potential bright spot is that, while mobile money is a payments service, it comes through a mobile phone, facilitating new ways to communicate with customers via text message and voice. Some providers are already experimenting in this area.

Other reported issues included lack of phones among some of the poorest Kenyans (many poor Kenyans borrow phones from others, making it difficult for financial service providers who need to identify the client before allowing them to withdraw money or receive funds) and poor service (including lack of float at the agent or downtime of the mobile operator's network).

Conclusions

M-PESA was launched only four years ago and its rate of uptake in the population has taken even Safaricom by surprise (over 70% of households, and 60% of adults regularly use it).¹⁰ Existing financial service providers offering new or enhanced products and entrepreneurs seeking to hatch new ventures have had little time to develop and test business models. Nevertheless, our preliminary investigations in Kenya reveal a growing demand from banks, microfinance institutions, and SACCOs and other financial service providers to connect their products onto the platform provided by M-PESA. We found few financial institutions that did not have some form of mobile money integration completed or underway and documented 90 specific cases which did. We also uncovered a number of new entrepreneurial ventures who exist solely on the mobile money platform (though none of these startups had generated significant volume of business as of yet). While the level of transactions going to and from the financial system through these newly enabled mobile money channels is still relatively low according to anecdotal evidence, and it does not yet seem likely that large numbers of new poor clients are being reached because of mobile money, these are early days and the level of activity is striking.

For this reason, we believe mobile money has strong potential to become a “catalytic platform.” The variety of new models and approaches being tried could portend a fairly fundamental realignment of the cash-based financial sector moving from all cash transactions mediated by expensive retail infrastructure to greater use of electronic payments through cell phones. Outsourcing cash handling will not only allow financial service providers to serve their clients at lower cost per transaction but also allow them to get more value out of their existing front office infrastructure and staff as they focus on more sophisticated tasks such as customer service, cross-selling, risk evaluation, etc. as opposed to cash handling. On the client side, customers will gain access to a dense network of transaction points, greatly reducing their costs to access financial services. And once clients are on the financial system, and able to transact at low cost with financial service providers, the platform enables a whole new set of services and delivery models which were not previously possible or profitable.

However, whether mobile money will achieve this vision in Kenya depends on operators and financial service providers' ability to overcome certain challenges: 1) Prices on transfers, especially through M-

¹⁰ See Suri and Jack (2011), “Mobile Money: The Economics of M-PESA”; NBER Working Paper No. 16721.

PESA, must be reduced, 2) Mobile money providers, especially M-PESA, must lower integration costs and develop a useful set of APIs, and 3) financial service providers must develop fundamentally new models for fostering relationships with customers when face-to-face cash transactions and the retail infrastructures associate with them are a thing of the past. If mobile money and financial service providers can overcome these challenges, Kenya's retail financial services market is poised to be transformed.

Appendix Table. Existing and in-process integrations with M-PESA and other mobile money platforms.

Note: since the list of providers integrating with M-PESA and other mobile money platforms is extensive, we have only included select number of those offering a new product through M-PESA.

Financial Institution / Company	Product	Sector				Category			Description
		Insurance	Savings	Credit	E-Commerce	Innovator	Integrator	Bridge builder	
Cellulant							X	Develops mbanking solutions for banks and SACCOs that help them use SMS messaging to/from their clients.	
Chamgamka	Chamgamka		X			X		Expectant mothers and her community save for future health services through M-PESA.	
Cooperative Insurance Company (CIC)	M-BIMA	X	X			X		12 yr endowment product that combines savings with a life and disability cover. Payments and claims are settled through M-PESA.	
Coretec Systems and solutions							X	Uses USSD technology to allow members to access services like deposits, withdrawals and loan payments through M-PESA.	
Equity Bank	M-KESHO		X				X	Offers account directly linked with M-PESA in quasi-real time.	
Flexus Technologies	Kopesha						X	Web-based application that allows microfinance institutions (MFIs) to disburse loans directly into the customer's M-Pesa account.	
Intrepid	ipay				X		X	Developing applications for MFIs and SACCOs. Also offer platform for online purchases with mobile money.	
Jamii Bora Trust				X			X	Currently enabling loan payments through M-PESA.	
Jua Kali Association	Jua Kali pension plan		X			X		Pension product for informal sector enabling small payments funded through M-PESA.	
Kilimo Salama	Kilimo Salama	X				X		Index-based weather insurance sold to farmers against drought using camera phone and scanning technology. Payments made through M-PESA.	
KOPO KOPO							X	Building a platform that integrates mobile money systems with a range of MFI and SACCO loan management	

									systems.	
Mamakiba	Mamakiba		X					X	Expectant mothers save through M-PESA for birth based on a savings calculator.	
Meru Mwalimu SACCO	All products		X	X				X	Integrated services with M-PESA platform through Spotcash application.	
Mobile Commerce Ventures Ltd	Jipange Kusave		X					X	New loan-cum-savings product delivered through M-PESA.	
Musoni								X	Virtual MFI that enables clients to repay their loans and deposit their savings using existing mobile money services.	
PesaPal									X	Web payment system that enables online buying, selling and bill payments with mobile money.
Symbiotic	Moca								X	Platform for online purchases with mobile money.
Tangazoletu	Spotcash								X	Connects SACCO accounts to the M-Pesa platform allowing users to withdraw and deposit their money from and to their account through the cell phone.
Webtribe	Jambopay								X	Platform for online purchases with mobile money.
Zimele asset management	Zimele pension plan		X					X		New mutual fund that allows smaller payments to be made through M-PESA.
Zege Technologies	Mpayer								X	Expedites MPESA payments by making transfers on demand as opposed to through batch-scheduled requests.