

PREPAID & PAY-AS-YOU-GO MODELS FOR ASSET FINANCING

Analysis of Mobile-Money Business Models for Kickstart (irrigation pumps) and M-KOPA (solar panels) in Kenya

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Acceptance of the prepaid airtime model—along with the emergence of mobile money—sets the foundation for new business models that allow innovative financing for people living on irregular incomes or with an aversion to credit.

The new pay-in-advance (prepaid) or pay-as-you-go models are electronic hybrids of old-fashioned savings and credit plans—but mobile-money systems give sellers and lenders the ability to collect millions of frequent micro-payments, which is impractical with manual or cash systems.

The key to prepaid models is their flexibility—you buy (or pay down or pay forward) what you can afford when you want, with no pressure to buy more or adhere to a fixed payment schedule. In all, this nascent model suggests that it might be possible to scale new and innovative products much faster, with a highly efficient system of financing, than has been possible before.

Here are the general questions this paper seeks to answer:

- To what extent does the prepaid concept that established mobile phones transfer to payments for durable goods and related services?
- Are the transaction fees on micropayments prohibitive and what are the solutions? Are people getting more comfortable sending money to people they don't know, such as businesses?
- How important is human interaction to kick off a new product? Human network (agents) helped market mobile phones and mobile money; are they needed to market other innovative financing models?

Our research focuses on two scenarios for prepaid or pay-as-you-go financing schemes in Kenya, where mobile money (particularly Safaricom's M-PESA) is virulent and many new mobile-money business models are in pilot or early post-launch phase:

- 1) A physical asset (Kickstart water pumps);
- 2) A physical asset plus ongoing service (M-KOPA solar panels, lamps and phone charger).

To be clear, we are not looking to identify the next mobile phone, which is perhaps the most successful product ever. Nor are we looking to analyze the merits or profitability of any one company or category of companies. We are looking to understand how the prepaid or pay-as-you-go business models might best be applied to other goods and services.

Several elements of the airtime model cannot be transferred, and the first is the scale of mobile telephony. As a global product that works for everyone, mobile phones and network equipment can be produced in large quantities, pushing down the price of phones and airtime. This is not necessarily the case for most products, which often require customized development and marketing that increases production costs and cuts into margins. That said, the global solar industry is witnessing rapid declines in costs and pricing.

Second, the benefits of mobile phones are readily apparent to most people, and even a rudimentary cost-benefit analysis (a phone call vs. a bus trip into the city) indicates that benefits

far outweigh costs. Third, in poor countries there is no alternative to mobile phones, as landline networks are scarce and unreliable and expensive. By contrast, for example, there is an alternative to solar lamps in kerosene lamps.

All these factors suggest that the demand for mobile phones is latent if not natural, and the major issue is developing infrastructure to reach remote regions. Most new product and services face a much higher bar in terms of creating demand, and can fall into the same trap that has snagged many development efforts (such as malaria nets) that focus on the supply side and not the demand side. Assuming that a product will appeal to the rural poor because it is clearly better than the alternative (if there is one), or better for their health or pocketbook, or better for the environment has stalled many otherwise worthy initiatives.

BUSINESS DESIGN FOR NEW MOBILE MONEY BUSINESS MODELS

Before examining the two cases, we isolate the factors that we expect should be part of any successful new product-and-financing design. We look at how the poor manage their money and what characteristics they value most highly in a financial product. We look at how the poor have used mobile money (e-money) to date, and to what extent that usage mirrors the use of cash. We look at the impact of a human (agent) network in creating trust in a new financial or technology product. We look at a class of services that is making the transition from postpaid to prepaid. Finally, we examine whether a business model that works for one product or service necessarily transfers to another.

1. Need for flexibility in terms of payment amount and periodicity.

People on irregular incomes, which is true for the majority of the world's rural poor, require flexibility in any financial instrument. The larger the commitment, the more flexibility required, because buyers may start paying during a harvest season and then have to continue in the off season when income drops sharply. This idea has been well established for some time, but is of particular interest when bumped up against electronic payment systems that allow limitless micro payments on an irregular basis, which would otherwise be inconvenient for the buyer and seller alike.

The need for flexible payments, both the size and timing, has been most forcefully advanced by Stuart Rutherford in various writings on how the poor in Asian and Africa save (Rutherford, 1999):

The overwhelmingly important problem facing the poor when they manage their money is that of building usefully large sums of cash out of their uncertain capacity to save. This results from a simple fact of life for the poor: income comes in small amounts, and most of it goes out again immediately in day-to-day expenditure. But there are, surprisingly often, many occasions when the poor need lump sums of cash that are large in relation to the sums they hold in their homes or about their persons. These needs arise from common life-cycle events, from emergencies, and from the appearance of opportunities to buy assets or invest in businesses.

Rutherford, writing well before the advent of mobile money, notes that good financial services for the poor are services that help the poor turn savings into lump sums. But, with the new electronic prepaid models, good financial services may also be those that allow people to pay in small increments on a daily, weekly or monthly basis to "lease" an asset or access a service in lieu of amassing a lump sum—or as a way to amass (layaway) that sum.

Nonetheless, Rutherford accentuates the need for flexibility "in as many different ways as possible" (saving up, saving down and saving through), "over as many different periods as possible" (varying from very short term for quick needs, to very long term), and in ways that are "*convenient, quick, appropriate, flexible and affordable.*" These adjectives could describe mobile payment systems, although it's beyond the scope of this paper to determine how "affordable" they

really are. Our feeling, untested, is that transaction fees are no more onerous than the negative savings rates that the poor often accept in exchange for keeping their money safe (see below).

In follow-on work with financial diaries that builds on Rutherford's work, the authors of "Portfolios of the Poor" (Collins, Rutherford et al, 2010,) come to a similar conclusion: "Of all the commonalities, the most fundamental is that the households are coping with incomes that are not just low, but also irregular and unpredictable, and that too few financial instruments are available to effectively manage these uneven flows. It is a 'triple whammy': *low incomes, irregularity and unpredictability*; and a lack of tools."

The authors note three basic needs that drive the financial activities of the poor—managing basic day-to-day cash flow; coping with risk and emergencies; and raising lump sums. The only one that cannot be easily addressed by pay-as-you-go models is coping with emergencies (unless there is a savings product in place).

When households try to build savings into large sums, security is very important, since the money may have to be stored for some time as it builds. Again, the mobile phone, when tied to a financial service such as M-PESA, clearly enhances security.

Structure, in the form of curbs on liquidity of the savings and rules defining the term, timing and value of deposits, helps self-discipline. Savers who use roving deposit collectors, such as the *susus* of West Africa, generally save daily for a month and then get back, at the month's end, all their deposits less one day's worth. That's a monthly rate of -3.3%, or -40% at an annualized rate.

Thus, while transaction fees on mobile micro-payments may seem prohibitively high, they may be no more prohibitive than high interest rates on microfinance loans or negative savings rates in *susus*. Security is valued more highly than a positive, let alone a good, rate of return.

Surprisingly, microfinance institutions, which purport to serve the very poor, typically enforce rigid and inflexible payback regimes on borrowers. The single most salient fact of micro-finance is that nearly all contracts are fixed in their repayment schedules, which creates a mismatch between debt payments and income. (Karlan and Mullainathan, undated). The authors cite reasons for this, from the difficulty of distinguishing slow flexible repayments from impending default, cash-management issues (monsoon, etc.) and the possibility of weakening borrowers' resolve to repay. But they note that while everyone has answers, no one has really tried to find out if these reasons are real or hypothetical. That, in essence, is what new mobile-money business models are now trying.

2. Trust and Human Networks in Uptake of New Products.

The rapid uptake of M-PESA, the mobile money service offered by Safaricom in Kenya, is a function of its product design, simplicity of use and consistent pricing—but trust in Safaricom was also a key driver in the initial uptake. The perceived safety of M-PESA, its widespread availability and its convenience are major reasons that early adopters of the technology chose to use it. "The institutional trust relations between the customer and Safaricom, the mobile service provider offering M-PESA, are strong," writes anthropologist Olga Morawczynski. "This means that customers use the M-PESA service because they believe that their money will be kept safe by Safaricom (Morawczynski and Miscione, 2008).

Developing trust in the new payment mechanism was difficult because Safaricom was introducing not only a new product but a whole new product category to a market that had little experience with formal financial services (Mas and Almazan, 2011). In this case, customers had to be comfortable with three elements that were new at the time in Kenya: (i) a payment system that was operated by a mobile operator, (ii) going to non-bank retail outlets to meet their cash in/cash out needs, and (iii) accessing their account and initiating transactions through their mobile phone (Mas and Ng'weno, December 2010).

The service sought to offer reassurance to customers in several ways. Customers receive instant confirmation of their transactions (which banks don't provide), which is important in helping customers to learn by experience to trust the system. From an early stage, Safaricom invested in customer service to help people deal with and resolve the problems they faced using the system, including the things they most feared: lost SMSs, PINs and phones. Although customer service was overwhelmed in the early months, customers quickly learned that M-PESA transfers were secure. In fact, whenever there were issues with the service customers tended to blame M-PESA stores rather than Safaricom.

Another reason for the high degree of trust in M-PESA is distribution through a wide human network, now numbering more than 30,000 agents in a country the size of France. Even though both Safaricom's voice and data services as well as M-PESA's mobile money service are modern and innovative technological tools, they were initially distributed by localized merchants—the top-up street merchants selling airtime, and the M-PESA agents cashing in and cashing out money. Just as the “phone ladies” in Bangladesh, who bought phones with microfinance loans and leased them out to villagers, sparked the widespread use of mobiles in one of the world's poorest countries (Sullivan, 2007), the M-PESA agents in Kenya put the human face on a crazy new product called mobile money. “The key to making this thing successful was not the technology *per se*, it was more the management of it, how would you get this to work,” says former Safaricom CEO, Michael Joseph. “And the key to that was the agent network—the people who would be doing the cash in and cash out” (Omwansa and Sullivan, 2012).

Thus, ubiquity, a human face in every neighborhood, and viral word of mouth, backed by solid product performance and superior customer service, were as important to the acceptance of M-PESA as its actual product attributes. Safaricom top-up salespeople and M-PESA agents, in effect, act as evangelists for new technologies.

The importance of trust can also be seen in mobile-money transfer patterns: People are still very cautious about whom they send money to. That, by extension, has implications for new mobile-money business models. Stuart and Cohen (2011) study the value of M-PESA to low-income individuals (\$2 a day) and the extent to which M-PESA can be used as a platform for financial services and business transactions beyond remittances. Using a diary method that tracked nearly 100 people who made 18,000 transactions over eight months, they found that 94% of transactions were still in cash, and that M-PESA's primary use was to send money home, usually from urban to rural households.

The authors developed a Distance/Purpose Framework that segments the e-money market by intended use (business or household) and distance (local or long-distance). Drawing on concepts from economic sociology, the authors show that Kenyans' use of M-PESA is embedded in pre-existing social and spatial relations and that M-PESA usage patterns mimic to some degree those of cash.

The Distance/Purpose Framework suggests that one big untapped sweet spot for mobile money providers is serving business market segments, either local or long-distance, and converting more local household transactions from cash to e-money. A key factor in shifting usage patterns is the degree of trust people have with the intended recipient, which explains why most transactions to date are between family and friends, or with community-based organizations such as ROSCAS, which rely heavily on pre-existing social networks for effective operation. A main reason for this is that users can efficiently verify for themselves with a response from the recipient—in addition to an electronic receipt from M-PESA—when a payment has been received.

Such evidence behind the uptake of M-PESA suggests that new products that wish to offer flexible mobile-money financing will need to establish trust with consumers by putting a human face on the product. Otherwise, consumers may be hesitant to send money to companies they do not know, even if they find the product desirable. Trust is not the only element needed to create

demand for a new technology, especially a financial service, but it is “table stakes” that precedes advertising, marketing and distribution.

3. Prepaid and pay-as-you-go payment models are spreading to traditionally post-paid services

It's too early to draw significant conclusions about the spread of the airtime prepaid model, but there are signals that it can supplant post-paid models for a variety of services that people already use and understand, such as electricity, TV and broadband access. As with prepaid phones, the key is flexibility and the ability to control how much you spend.

To date, the most widespread implementation is for on-grid electricity usage. For example, roughly 10% (210,000 customers) of Kenya Power's more than two million connections are now pay-as-you-go customers. Kenya Power has switched out the older meters that agents used to read once a month for billing with meters that can be monitored remotely. Every meter has a unique account. The customer uses a PayBill number (to direct payments to Kenya Power) and the account; Safaricom send an SMS indicating the amount that has been debited from the M-PESA account; Kenya Power sends an auto-generated token (a string of numbers) to represent the number of electricity units bought. The customer enters the token into the meter, and the number of units is shown on the screen. When the units reach zero, electricity is automatically disconnected, but can be quickly reconnected by buying more units.

This appears to be a win-win proposition. The consumer never receives a bill, and doesn't have to wait in a long line to pay the monthly bill. Kenya Power saves money because it doesn't need to read meters, manually disconnect and reconnect or generate a bill. It does, of course, need engineers to install the new meters (a one-time expense), and has invested in a call center to handle customer queries and concerns. Kenya Power, which hopes to convert all consumer meters in five years, says demand is overwhelming. Businesses remain on post-paid accounts, but Kenya Power is looking to install “smart” meters that can be read remotely.

Cashpower in Rwanda works in a similar fashion, except that customers can either use mobile money to order electricity from home, or pay cash to buy a voucher on the street from an agent (much as one buys airtime). The voucher has the code to activate electricity.

Two other pay-as-you services from South Africa —one broadband wireless and the other cable TV—hint at the potentially transformative nature of the new business model. Satellite Hot Spot provides connectivity to remote areas, with only satellite dishes and routers required. The product is aimed at entrepreneurs who want to set up Internet cafes. The traditional billing model charges the client for bandwidth even if it's not resold to end users. However, in this case, the Hot Spot router connects to the Sat-Space billing system, allowing the entrepreneur to purchase vouchers (as with the electricity models cited above). Bandwidth is charged for only when used, effectively creating a prepaid model. The new financial model removes risk for the resellers and ensures their business remains cash positive. We have no data on the uptake of this service, but it clearly solves a business problem that has hindered broadband deployment into remote areas.

There is better data on South Africa's TopTV cable TV. In the first three months after allowing customers the option of prepaid or postpaid, the company issued 70,000 vouchers to distribution partners, and has been activating 500 vouchers per day. (A voucher is good for 30 days viewing.) TopTV, it should be noted, is in some distress as a business, in large part because many of its 400,000 subscribers have lapsed on payments and only 150,000 are active.

But TopTV indicates that the prepaid model is proving to be a preferred payment option. Of the prepaid vouchers that have been activated, close to 65% have been activated by lapsed or disconnected customers. Close to a quarter of active subscribers switched to the prepaid voucher option, and more than a quarter are new subscribers who signed up after the prepaid option was introduced. Says CEO Eddie Mbalu: “We believe that we have now found the right business

model: one based on flexibility and that understands the current realities of doing business in South Africa, where many South Africans are unbanked and financially excluded.”

Kenya Power, Cashpower, Hot Spot and TopTV are representative examples of how the airtime model is spreading to other services. In the first three examples, there is no need for a durable good; in the last, TopTV, the consumer obviously needs a TV, just as a consumer needs a phone. But the conclusion is the same: When people are accustomed to paying after-the-fact for what they consume (post-paid)—even if they don’t actually “consume” and are often shocked by the bills—they are quite willing to convert to prepaid, which gives them imminently more control over their finances.

A counter example of a product for which consumers are not used to paying for and which has not taken off to date is Grundfos community water pumps. The Grundfos system has an automatic water dispensing facility linked to M-PESA payments. Such services are proving slow to take off due to the high cost of metering equipment and, to date, low uptake. In the case of Grundfos, the cost of the water charging and dispensing unit increases the initial deployment outlay per site by 250% (Mas and Ng’weno, 2012). Further, Kenyans are not used to paying for water, and have shown a willingness to walk a considerable distance to haul water back to their village.

4. “Small is beautiful” but ‘micro’ models don’t always work

It’s tempting to think that a business model that works well in one country or with one type of product will translate to new products or geographies as long as the target market is similar, in this case the rural poor. That is, if the prepaid airtime model worked to perfection (albeit with widely divergent pricing) to fuel the spread of mobile phones in poor countries, why shouldn’t it work to perfection to fuel the spread of other desirable technologies? If M-PESA is a runaway success in Kenya, why is mobile money struggling to gain a foothold in most other countries, despite the widespread success of mobile phones? Considering mobile money *business models*, if people are willing to electronically “top up” their mobile phones with pay-as-you-go airtime, shouldn’t they be willing to “top up” pay-as-you-go accounts for other products?

Proponents of marketing to the base of the pyramid, notably C.K. Prahalad (Prahalad, 2004) and followers, mention *sachets* (small packets) as an innovation that has delivered many products to BOP customers. Prahalad suggests that if BOP customers “don’t have lump sums to buy 20 ounces of shampoo at one time,” a company should “do what Unilever did in India: Sell single servings of shampoo so the cost structure matches what they can afford” (Fast Company, 2005). This, of course, lines up well with Rutherford’s (and others’) theories about the need for flexibility and convenience. But, as appealing as sachet marketing is, how effective is it across different products and geographies?

Jaiswal (2007) takes issue with Prahalad’s conclusions:

Prahalad (2004) argues that because small packages are more affordable, they encourage consumption and provide a choice for the poor. But the empirical evidence does not support his contention.... For products including biscuits, jam, washing powder, sanitary napkins, and milk powder, the smallest available packages are not the largest contributors to the total volumes of products sold in rural areas. The two exceptions are shampoo and razor blades; for these two products the smallest packages do account for the largest share of the total volumes sold. In the cases of jam and milk powder, larger packages (e.g. 500 g) are better sellers even though smaller packages are available (e.g., 12 g in jam and 3 g in milk powder).

If Prahalad and Hart (2002) are correct in their argument that the poor “look for single-serve packaging,” then we would expect small-size packages to be the most popular for most products in rural markets, not just for shampoo and razor blades. The smaller

packages of shampoo and razor blades also perform better in urban markets as well as rural ones. For shampoo this is probably true because shampoo sachets offer better value than larger packages. With sachets, consumers pay lower prices per unit volume... For most products, the logic of serving the poor by simply offering smaller packages may not be as workable as Prahalad argues. To make small packs more affordable, companies must keep their unit cost lower compared to larger packs. This does not make economic sense: it is by selling larger packages that companies can reduce their processing and transaction costs, not the other way around. Companies usually reward consumers who buy larger, or economy-size packages, through low-unit pricing, because of their associated cost savings. Low-price shampoo sachets are an atypical case or an unusual distortion of the market.

This analysis suggests that the poor will buy sachet packets if they get better value per unit, and will buy larger packages to get the bulk discount. This, of course, fits with general economic theory about maximizing value. But, just to show how difficult it is to make assumptions about product sizes for certain products that sell well in certain countries, and how behavioral economics often contradicts general economic theory, consider the case of kerosene and LPG gas containers in Kenya. The poor are more likely to buy kerosene, even though it is more expensive than LPG on a unit basis, because they can buy in very small amounts as opposed to a full cylinder. That is, even though it is more expensive, the cash outlays meet their need for flexibility (small amounts and less cash outlays).

Kerosene in small amounts sells in Kenya as well as razor blades and shampoo sell in sachets in India, even though it is a more expensive fuel than bulk LPG gas containers (Bhan, 2012):

One of the reasons that kerosene is so hard to dislodge as the fuel of choice among lower income populations is that it can be purchased on demand, on a pay as you go (italics added) basis. That is, it can be purchased by quantity (as little as 1/4 litre) or cash amount ('give me 50 KShs. worth of kerosene') as and when required. There is no imposition on the customer to purchase any fixed minimum quantity or cash amount.

LPG [in Kenya] comes in cylinders of fixed sizes. Thus, it requires a "lumpsum"—either for first purchase or for a refill, although, over the duration of use, it provides a better return.

[In Nairobi], those who use kerosene as their "fast cooking" fuel, as opposed to slower charcoal for their primary cooking, still end up requiring a litre a day – that's 3000 KShs. (Kenyan shillings) a month, while the cylinder costing 4000 KShs. can be made to last for 3 months before requiring a refill. Refills cost 2000 KShs."

Jaiswal argues that the reason sachets work in some case but not others is a function of price. Consumers will buy the package that provides the best value, whether or not it is a small cash outlay. Bhan argues the opposite: that the ability to buy goods through a pay-as-you-go model is sometimes more convenient than amassing a lump sum, even if that lump sum will save considerable money over the long term. Of course, LPG is less readily available than kerosene, which, in turn, is less readily available than charcoal.

This latter finding, consistent with the work of Rutherford and Collins, suggests that in designing pay-as-you-go mobile-money business models for new products and services, pricing may be less important than flexibility and convenience—just as people are willing to accept a negative interest rate from *susus* because of the safety and structure provided for their savings. But, as with the case of Prahalad's sachets, and with Stuart and Cohen's trusted networks, no marketer can assume that any new system will necessarily disrupt long-held social and behavioral patterns. Rigorous piloting and learning on the ground is required.

PAY-AS-YOU-GO, MOBILE MONEY BUSINESS MODELS: KICKSTART and M-KOPA

With these general design issues in mind, we look at two cases of pay-as-you-go financing in Kenya, both using M-PESA, and both aimed at rural customers on irregular incomes:

- 1) A physical asset (Kickstart pedal water pumps).
- 2) A physical asset plus ongoing service (M-KOPA solar panels plus lamps for daily lighting and phone charging).

The goal is not to predict the long-term success of these initiatives, which are in very early stages, but to examine the business design against the basic principles outlined above and identify other elements that are key to business success.

Kickstart: *Tone Kwa Tone Pata Pump Mobile Layaway*

KickStart International, a non-profit social enterprise that operates in several African countries, sells pedal-powered water pumps that provide rural farmers with a means of irrigation. KickStart sells a cumulative 25,000 pumps per year in all its markets, with 8,000 sales a year in Kenya. One of its most popular pumps is called the MoneyMaker, because it is virtually guaranteed to increase a farmer's income; however, a pump and hosepipe will cost a farmer from \$65 to \$185, a significant "lump sum."

Pumps are sold through a dealer network of agricultural stores. Some dealers create their own informal layway plans with farmers they know, taking small payments in advance and allowing farmers to save the entire purchase price. KickStart saw an opportunity to formalize the program and tie it to M-PESA mobile payments, to add another level of convenience to the farmer and save him trips into the market town.

Kickstart's mobile layaway program is called *Tone Kwa Tone Pata Pump* ("Drop by Drop" Gets the Pump). After a 15-20% deposit, payments on the remainder of the purchase price can be made at any time, in any amount—as long as payments are completed within three months. Using an M-PESA PayBill number assigned by Safaricom to Kickstart, farmers send money as they can. Safaricom sends a message back confirming funds received, while KickStart sends a message that the funds were received *and* how much balance is left. KickStart also provides reminders when customers begin to lag in payments.

Before launching TKT, KickStart conducted a two-phase pilot. The main objective of Phase 1, which ran from September 2010 through January 2011, was to implement the basic structure/system/procedures for offering layaway and to test initial hypotheses. The main objective of Phase 2, which ran from February 2011 through June 2011, was to incorporate feedback from Phase 1, deploy improved system/processes, and refine service design for a nationwide launch.

During Phase 1, 13 KickStart sales representatives from four regions of Kenya registered 27 customers. During Phase 2, 18 KickStart sales reps from three regions of Kenya registered another 67 customers. During the pilot phase, the average mobile payment size was KShs. 1,054 (\$12.25). While a typical Kickstart customer took an average of 12 months to save for a pump, mobile layaway customers completed payment within an average of two-and-a-half months.

In October 2011, KickStart launched TKT nationally (though not all areas in the country are covered). By January 2013, 270 customers had bought a water pump through the mobile layaway program. Others, the actual number unknown, continued to buy pumps through informal cash layaway programs with retailers.

After two pilots and a national launch, TKT has been somewhat disappointing, although extenuating circumstances (the company was in the middle of a corporate restructuring) had

some negative impact on operations and marketing. Even though TKT is not sustainable in its current form, Kickstart is committed to the program and has begun to codify its knowledge to date:

- **Gender.** 30% of TKT users are women. Women are less likely to pay by cash, let alone in large amounts. Most women believe that cash should be handled by their husbands. This suggests that mobile money seems to empower women to make their own financial decisions.
- **Payment patterns.** Customers who have regular income make large deposits at the end or beginning of the month and tend to finish faster. Others do smaller chunks over the course of the month and take longer to finish. During focus groups, it became clear that most customers make payments when they receive bulk payments from their farm produce, or sale of an asset like a cow. Initially, Kickstart made the layaway open-ended, but found that after nine months people lost interest. Thus, Kickstart now caps the layaway period at three months and ties it to a harvest for quick payoff.
- **Reminders.** The second most significant trigger (after a harvest) is follow-up by sales representatives (SRs) who give customers friendly reminders. Customers who had more face-to-face interaction with the SRs ended up with larger savings and paid at a higher frequency. SMS reminders alone did not have nearly the same impact. SRs interact with customers at a very personal level, visiting them at home or work.
- **Sales incentives.** Motivated SRs end up with fast-paying customers; less aggressive SRs get less impressive results. Kickstart has had to increase the incentives for the SRs to keep them actively signing up new customers and following up with them. Initially, a SR would be paid KShs. 100 for signing up a customer, KShs. 50 when the customer reached 70% of savings and a final KShs. 100 when the customer finished. Now, SRs earn KShs. 300 when they sign up a customer and a bonus dependent on the number of customers signed up.
- **Retailers.** Store retailers want cash up front, to smooth their cash flows, and TKT payments come more slowly since they are reconciled through Kickstart. Thus, retailers do not promote TKT. In addition, retailers don't like to promote water pumps because they feel that SRs are paid to do so. This is a dependency problem for KickStart.
- **Money transfers and transaction fees.** Many rural farmers are comfortable with P2P money transfers to people they know, but don't fully understand the PayBill concept (which is more often used in urban settings). At first, SRs have to show many farmers how to use PayBill.

In some cases, farmers don't like paying the KShs. 20 transaction fee (Kickstart pays an additional KShs.10) and give cash to the SRs who send the money from their phone to Kickstart but enter the customer's account number. Thus, the SRs absorb the transaction fee. It is not clear what the implication would be if the transaction fee was fully absorbed by KickStart.

Focus group discussions also revealed that some customers don't have time to visit an M-PESA agent to convert cash into e-money, and prefer to give cash to the SR. In some cases, customers worked as groups (not unlike a savings group merry-go-round) and collected cash, which was then given to the SR.

Analysis: Kickstart is in the business of designing, manufacturing and selling water pumps. Designing, managing and promoting a financial service is a very different business and has been a challenge. Unlike Safaricom, which has a huge budget to support new initiatives, Kickstart's ability to venture into new an unfamiliar territory is limited.

A layaway program gets complicated when pump prices rise or fall before customers have finished paying, which is one example of how new financing options veer into a new business for which the company is unprepared. When prices go up, Kickstart is forced to honor its

commitment despite a higher cost of production for a pump that will be delivered in the future, and when prices drop, customers expect to benefit from the new prices.

TKT does offer incredible flexibility for payment amounts and timing, although the three-month cap is tight. But it's not clear that the intended target market (poor rural farmers) is sophisticated enough to understand the value. For example, the unwillingness to use PayBill ties back to the Stuart/Cohen Distance/Purpose Framework, which suggests people don't want to send money to people they don't know. The best uptake of the TKT product is from people who have higher incomes than most rural farmers, and they pay faster. This makes TKT promising as a sustainable service, but right now that is not the case, and certainly not for Kickstart's target market of poor rural farmers. As it is, TKT does not generate enough revenue to pay overheads (customer care, time, data analysis, administration etc).

The company must create demand for both the pump and the financing program, and each requires different skills and approaches. It might be easier to hand off TKT to a financial institution, but even MFIs rarely create appropriate products for this market and none has expressed interest in taking it over. Another solution may be to work with M-PESA agents, but Safaricom may not see the value in this because of Kickstart's low sales numbers.

Kickstart may have a strong human network of SRs, but it may be that too much is asked of them—especially if the dealers' interests are not aligned with those of the SRs or Kickstart itself. It's likely that Kickstart needs a strong trigger to incentivize both farmers and retailers. (The 300 KShs. commission, for example, is extremely low.) To reduce the effort by SRs, KickStart is considering working with groups of farmers, modelled in part on Grameen Bank's group lending. Group dynamics could accelerate savings and add to the discipline necessary for saving. A "guarantor" who is not financially liable but applies social pressure could be paid KShs. 50 or so for every payment the group makes.

In addition, KickStart could offer the pump on a "rent-to-own" basis, allowing farmers to start using the pump after paying a deposit, even as they continue to pay the full price. This arrangement could work better in groups, taking advantage of group behavior to insure that the pump is maintained and not stolen. But the risk of losing collateral would likely increase the selling price, which is already relatively high, and likely require a higher deposit (30% rather than 15-20%). Nonetheless, the ability to use the pump before purchasing could be the missing trigger that allows customers to fully realize the money-making value of the farm tool.

M-KOPA: Pay-as-you-go solar lighting/ phone charging system

M-KOPA ("m" for mobile, kopa for borrow) sells a solar lighting and phone charging system on a pay-as-you-go basis, with payments accepted only through M-PESA. The target is rural Kenyans with informal incomes who are not connected to the power grid. An estimated 70% percent of the Kenya population lives off the power grid. Kenya does have a solar culture, with a roughly equal number of homes powered by solar (4.2%) as by electrical grid (4.3%). (Jacobson, 2007).

M-KOPA launched in June 2012, after nearly two years of piloting and business design. By March 2013, more than 8,000 systems had been sold. Very few were paid in full, the vast majority were still paying off loans, and very few customers had defaulted and seen their solar panels repossessed.

The system, manufactured by d.light (a for-profit social enterprise that distributes solar systems in many developing countries), includes solar panels (4 watts), a control box, three lamps and a mobile phone charger. The system is not expandable, i.e., you cannot add more lights or any

appliances to it. A SIM chip embedded in the unit allows remote monitoring, disconnecting and reconnecting depending on the customer's payment performance.

Distribution is through an agent network. At launch, M-KOPA had 50 agents clustered round two cities, Eldoret and Nairobi. By March 2013, M-KOPA had more than 400 agents (which M-KOPA calls "outlets") and sales of 500 per week. Some of the outlets are M-PESA agents (now numbering more than 40,000), but most run other merchant businesses. Agents are paid by commission, at an estimated 8-10% (figure not verified). Regional and area managers recruit agents, demonstrate how the product works and explain the business model and opportunity. This management model is roughly similar to the hierarchical Agent/Sub-Agent seen with M-PESA. Jesse Moore, Managing Director of SignalPoint, which launched M-KOPA, says that the issue for agents is not so much the commission, but the volume of sales and the growth path of sales. Aligning the agent's interest with that of the company and customer is clearly key to success.

To sell a solar system, the agent deposits KShs. 1,250 (\$14.50), which s/he does not see again until the customer pays off the loan. The agent is partly responsible for ensuring that customers pay off the loans, and their commission is based on the amount paid to a particular point. If the customer defaults, M-KOPA is liable, but if M-KOPA finds the agent is responsible for the default, the initial deposit is not returned.

To buy a system, customers pay an initial deposit of KShs. 2,500 (\$29) to M-KOPA. (Along with the deposit from the agent, M-KOPA takes in KShs. 3,750 upfront). Were customers to pay the total at the outset or soon thereafter, the minimum payment is KShs 14,600 (\$170). But a large number make daily M-PESA payments of KShs. 40 (or the equivalent, such as KShs 200 for five days), which is the minimum allowed. Customers who take a full year end up paying KShs 16,900 (\$196), which includes the original KShs. 2,500 deposit along with interest and transaction fees (see below). To track payments and match them to a specific customer, M-KOPA matches the IMEI number of the solar SIM card with the customer ID number. (This information allows other people to pay for a recipient's solar panel, which many have done as a form of targeted remittance.) Customers are encouraged to refer others and earn points through referrals. Some customers have paid off their system through such bonuses.

M-KOPA arrived at the KShs. 40 daily payment amount after extensive research and piloting—pegging it to the amount a typical kerosene user spends per day. From a marketing perspective, this also allows M-KOPA to position solar as an alternative to kerosene, touting its health benefits—and adding that after payment is complete the solar energy is free as long as the system lasts (lifespan is 10 years). [Inhaling fumes from fuels, including the coal and biomass used to power stoves and lamps in many developing nations, has the same effects on an individual's health as smoking two packs of cigarettes a day, according to the World Health Organization (MGregor, 2012).]

The relationship between M-KOPA and its customers is primarily based on trust, with the agent as the human face that establishes the connection. Nonetheless, M-KOPA does a basic know-your-customer audit and assessment of credit through an initial interview about income sources and cash flow. Interestingly, M-KOPA does not check airtime or M-PESA usage to establish credit worthiness, as other M-PESA based banking products (M-KESHO and M-Shwari) do.

Just before the M-KOPA account balance hits zero, the customer receives an SMS warning followed within a day or two by a system disconnect. M-KOPA controls this through the SIM card built into the system. Two days later, an SMS reminder asks for payment to reactivate the system. If no money is sent, M-KOPA assumes a problem, and follows up with a phone call asking whether the customer is committed to finishing payment and agreeing to a timetable. If that doesn't work, M-KOPA calls again and suggests removing the system (and refunding all money paid to date). So far, most customers have asked for more time and continue to pay. Only seven solar systems have been taken back and refunded by M-KOPA (estimated, but not

confirmed by M-KOPA). Once the loan is paid off, the customer owns the solar system (which has a one-year warranty) and has no further interaction with M-KOPA.

The current tariff negotiated between M-KOPA and Safaricom requires the customer to share the transaction cost with M-KOPA. Initially, M-KOPA was to absorb the entire cost, but it quickly became apparent that it would not be sustainable because the more payments a customer makes the more M-KOPA would pay Safaricom in transaction fees. The table below shows the tariff provided to M-KOPA agents. The primary motivation is to encourage customers to make large payments, making transaction fees a smaller percentage of the payment, and requiring fewer payments and hence transactions fees.

M-KOPA TRANSACTION FEES

Amount deposited (KShs.)		M-PESA fee (KShs.)
Min	Max	Charge
10	49	5
50	99	10
100	70,000	15

M-KOPA Analysis: M-KOPA's business model is not unlike the mobile phone model, which requires an ongoing payment to make use of the physical asset. The difference, of course, is that phone customers buy the phone outright at the beginning, while M-KOPA customers can start using the solar system after an initial deposit. This allows people to experience the value of a big-ticket, new technology product before they are required to fully pay for it.

M-KOPA's agent network ("outlets") is growing fast, and well incentivized to maintain contact with the customer until s/he pays off the system. M-KOPA's own SMS messages and phone calls add another human touch point to the customer experience.

The payment schedule is flexible, but well structured. M-KOPA expects a daily payment or equivalent (i.e. paying in advance a week at a time). Its ability to shut off the system is key, and clearly a strong point of leverage with customers who quickly learn to value the service. The inclusion of a mobile phone charger is both a trigger to buy the system—kerosene can light a room but cannot charge a phone—and insures that people have no excuse not to make M-PESA payments.

The M-KOPA model checks many of the design elements needed to market to the rural poor: flexibility with structure, a human network to build trust in a new technology, and various triggers to spur purchases and payments.

But the Kenyan solar market is competitive, and it's conceivable that solar could become a commodity. Thus, M-KOPA's financing scheme/SIM card could be its "unique selling proposition." And if M-KOPA's solar catches on, M-KOPA branding could carry over to other electrical appliances, such as TVs, refrigerators and radios, which the company is already planning, both in Kenya and through possible expansion into Uganda and other markets.

CONCLUSIONS

Looking back at the questions we asked at the outset, what answers can we give, and what further conclusions can we draw or questions can we ask?

- Clearly, the prepaid *concept* does transfer; whether it will be widely implemented in practice is not yet clear. The concept transfers because it allows the flexibility that consumers on irregular incomes require. And the prepaid/pay-as-you-go concept potentially obviates the need to amass a lump sum to buy a big-ticket durable good. This is the case when a company, such as M-KOPA, can automatically “repossess” a good if payments lag by turning off the switch (SIM card).
- The issue for companies is that they essentially are running two very different businesses—selling the product, and selling the financing mechanism. That requires investment, education and alignment of interests across a wide spectrum of actors, from dealers to agents to customers. It’s quite possible that a “greenfield” company built from the ground up on mobile money payments has an advantage in aligning these often competing interests. Kickstart clearly has issues with its dealers, who are not supportive of its TKT mobile layaway program.
- The importance of piloting programs to learn and recalibrate is clear. Both Kickstart and M-KOPA have made several alterations to their initial business models.
- Are the transaction fees on micropayments prohibitive and what are the solutions?
 - We did not specifically study this question, but it’s clear that there is an awareness of the issue. Farmers buying Kickstart pumps often asked their sales representatives to make payments and absorb the transaction fees, although another piece of this is the farmers’ discomfort with M-PESA’s PayBill function. One advantage of Kickstart’s accelerated payback schedule, from nine months to three, is that it reduces the number of transactions and thus fees.
 - M-KOPA, which originally planned to absorb all transaction fees, decided that doing so for the slower payers would be prohibitively expensive, and now splits the fees with its customers. For the moment, M-KOPA seems unlikely to force an acceleration of payments, because its KShs. 40 is equivalent to typical kerosene usage, and thus a convenient benchmark for customers. Looked at another way, the transaction fees may simply be considered as a fee-for-service, i.e. lighting and charging.
- Are people getting more comfortable sending mobile money to people they don’t know, such as businesses?
 - Yes, especially if they have already been in a business relationship, such as Kenya Power customers. The same is true in many instances of school tuition payments, or interactions with microfinance institutions, which were not a subject of this paper. In addition to familiarity with the business, there is clearly a divide between rural and urban customers, the latter apparently much more comfortable with PayBill.
- How important is human interaction to kick off a new product? Human network (agents) helped market mobile phones and mobile money; are they needed to market other innovative financing models?
 - Yes. It’s clear that the more aggressive Kickstart sales reps are more successful, handholding customers as they walk through a very new process. For M-KOPA, which allows customers a full year to pay off its solar panels, agents are key to encouraging customers. In both cases, reminders to continue paying come from agents and phone calls, and are more effective than SMS messages. M-KOPA has also found that its customers are often its best evangelists, spreading the word to friends and family.

Pay-as-you-go business models are definitely spreading beyond the mobile/airtime model, first taking hold with services that are currently post-paid. A few experiments in asset financing of big-ticket durable goods show the huge potential for low-income people on irregular incomes to securely save in targeted fashion. These experiments also show the hurdles that companies must overcome both to educate consumers and to align multiple interests.

The introduction of SIM-based shutoffs allows marketers to give people access to goods before they have fully paid for them, and to “repossess” them automatically if payments lag. This shows huge potential for solar panels, on-grid electricity, cable TV and satellite broadband, to mention a few of the early experiments. But there is no reason why this technique and business model could not be extended to a wide range of goods. And, because of the ease of making payments from afar, financing could be marketed as a targeted remittance, wherein wealthier relatives pay for high-ticket items, just as they first spurred the growth of mobile money by sending e-money into villages.

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