

Digital insights build trust and enable growth

Introduction

Digital is at the very core of what M-KOPA offers. We provide pay-as-you-go solar energy and associated financial services to more than 400,000 customers in East Africa, using digital technology to understand our impact and improve our services.

In line with the aims of the Lightbulb Series, this paper gives practical examples of digital technology at work, highlighting the lessons learned and adding to the overall knowledge of digital delivery models in this nascent sector.

Mobile technology has provided a leapfrog opportunity for the delivery of digital services in Africa. The number of mobile connections in Africa has risen by over 340% since 2007 – a growth rate three times higher than the global average¹. This growth has paved the way for mobile financial services such as Kenya's M-PESA, with an estimated 80 million active mobile wallets in Africa².

M-KOPA takes this connectivity one step further. We use the mobile network and mobile payments to offer pay-as-you-go clean energy and a path to asset ownership.

This paper is divided into three sections, explaining how we have used digital technology to:

- **gather customer insights**, which have helped to create and shape our business
- maintain strong customer relations and monitor impacts, helping to **build customer trust** and successful growth, and
- pave the way for **new opportunities** in adjacent sectors.

The final section draws conclusions and conveys the important message that technology is just an enabler. Truly scalable success will come not from digital solutions alone but from having a relevant, affordable solution to a problem and a well-executed business model.

¹ www.itu.int/en/ITU-D/statistics

² www.gsma.com/mobilefordevelopment

M-KOPA: The story so far

M-KOPA is at the forefront of digital service provision in East Africa. Our pay-as-you-go solar energy service uses the latest solar and telecommunication technologies to improve the lives of thousands of families. We offer easy access to solar power that costs less than traditional, unsafe kerosene. Our model has the potential to reach millions of people who live off-grid or suffer from unreliable electricity supplies. This paper examines how digital technologies are helping to shape and grow our business.

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Section 1:

Customer insights

From the beginning, M-KOPA has set out to gather data to understand in detail how to design a service that solves problems for customers and meets their needs. Since our launch in 2012, we have conducted regular research with customers, using our trained research team as well as external agencies.

We also gather data continuously from the solar devices in customers' homes. Each unit is SIM-enabled to report data on location, use, performance and even external conditions such as temperature and solar radiation.

Willingness to pay

Our first use of customer data was in our pre-commercial pricing experiments. Our simple objective was to discover whether customers would be willing to pay for solar energy.

With grant funding from the Shell Foundation, we built and deployed a minimum viable solar energy solution in 2010. From this, we gathered real-time data on energy system use and payments.

The data provided early evidence that customers would pay for clean energy if they could avoid the one-off cost of the relatively expensive hardware (a solar panel, battery and lights). Daily spend on kerosene – a poor quality, expensive and dangerous fuel – was the main competition.

The ownership model

Research showed that, while one-off hardware costs were prohibitive, customers had an appetite to own the hardware. Enter our digital solution. Customers make mobile payments via M-PESA, allowing them to pay for the solar home system (SHS) hardware over time. Mobile connectivity to the SHS allows us to control the system remotely according to the payments we receive.

We decided to target repayment for the first system within 12 months. This allows the customer to acquire ownership in a reasonable time for a daily repayment rate of less than the amount they previously spent on kerosene, torch batteries and phone charging.

There are large numbers of people who cannot afford an M-KOPA system and who can spend very little on energy sources and there are many potential customers who spend much more. However, it was important for us to determine the right entry-level price point to give us a viable customer base and develop a strong customer pitch around the idea of 'displacing' the costs of kerosene.

A 12-month target repayment period is also well within the technology lifetime of the SHS (which is typically four to five years) and so made logistical sense to us in terms of working capital repayment cycles.

Finding the optimum price

Data from the pilot phase also helped us determine the optimum pricing for our product. We compared the cost of delivery (total lifetime costs including hardware costs, delivery, connectivity and data fees) with customers' willingness to pay and their current spending on energy. We aimed for a balance between the amount of power provided by the SHS and a realistic daily fee that would allow us to recover costs and make a positive contribution to the business.

Ensuring simplicity and flexibility

Our detailed testing of the payment conditions highlighted the need for simplicity and flexibility to align with customers' variable household income. Most of our target customers had no credit history and raising finance from traditional sources to purchase the solar hardware would prove difficult and expensive. Our proposition was simple: demonstrate your commitment through a deposit and then make top-up payments via M-PESA in any amount you can afford, anytime, 24/7.

Early experiments taught us to not charge for energy use per se as this over complicates the deal. Instead, the customer buys units of time: each credit they buy enables the SHS to discharge power for 24 hours.

Importantly, we did not insist on a fixed payment period, recognising the need for customers to pay according to cash flows in their household. For example, they could choose to buy more units of credit after a crop sale and pay more slowly when school fees are due.

Testing the size of the deposit

As the business has matured, we have continued to invest in small rapid pilots to gather data and test different pricing options. The results of these trials drive our key business decisions

One important trial tested the impact of the deposit payment size on customers' repayment performance. We tracked repayment behaviour for various cohorts of customers offered different payment options and used this data to produce heat maps of various repayment performances.

Analysis of the data showed that the size of the deposit we require from a customer is a strong indicator of their likely repayment performance. Put simply, a lower deposit can encourage more customers to join M-KOPA, but this carries the risk of lower repayment behaviour over time.

Ongoing monitoring

As we moved towards our commercial launch, we invested in technology that would enable us to gather a vast array of real-time data from the solar energy devices. Every day, we now collect more than 8 million data points from devices in customers' homes. These include location, battery performance, temperature, usage, solar input efficiency and, of course, communications with the customer and payment history.

All these insights would be far harder and more time-consuming to collect if the hardware was not connected to network.

Section 2: How digital delivery can build trust

Customers on low incomes deal with complexity and manage acute financial risks on a day-to-day basis, often juggling competing demands for small amounts of spare cash and working ceaselessly to maintain cash flow³.

We aim to build trust among these customers, assuring them that the risk of signing up to our service is low. Our digital delivery model offers flexibility, can help with cashflow and ultimately saves customers money.

Helping with cashflow and boosting income

In our regular surveys with customers we have tested how much money customers save by using M-KOPA instead of using other fuel sources. The average reported savings per week on kerosene are around 350 Kenyan shillings (approx. \$3.50), which is approximately the weekly cost of the current M-KOPA SHS. This means our average customer is able to completely pay for their device through savings on kerosene expenditure.

We often poll customers on the use of these savings and it is clear that the money saved helps to solve other cashflow challenges. Over 60% of customers, for example, report that they have put the savings towards school fees.

Moreover, and certainly not anticipated in our early business cases, some 30% of our customers use their solar device to generate a little income from phone charging, as show in Figure 2. Although hard to quantify, solar lighting also allows businesses to stay open for longer for lower costs. These data mean we can now more actively promote these income generation possibilities to customers.

³ Portfolios of the poor / financial diaries

Figure 1: Percentage of customers who report saving money after M-KOPA purchase

Has the M-KOPA Solar System helped your household save money?

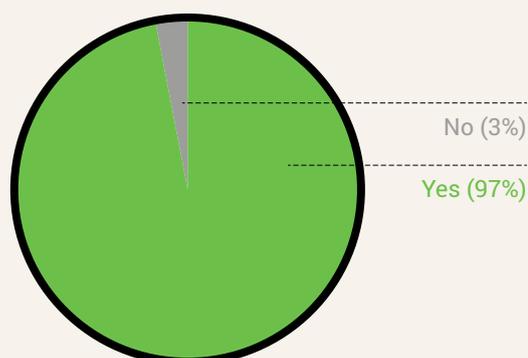
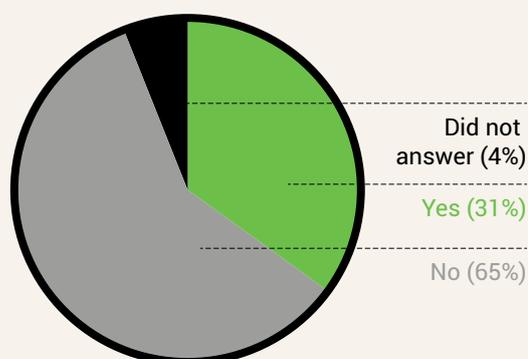


Figure 2: Income generation opportunities

Have you used your M-KOPA system to generate additional income, such as phone charging or longer business hours?



Building a relationship with the customer

In our business case, we factor the costs of staffing and running a call centre with a fully integrated customer relationship management system. This is a strong foundation on which to build trust.

At the very outset of our relationship with a new customer, we make a clear promise that our hardware comes with a warranty and that customers can contact us on a 24-hour basis. We employ more than 300 staff in call centres across East Africa. In Nairobi, the team takes thousands of calls every day, ranging from simple enquiries about how to purchase an M-KOPA system through to detailed technical troubleshooting.

In addition to the call centres, device connectivity enables us to be close to the customers and gather data first-hand about their experiences. The technology we use lets us do this remotely and at low cost, even where we build sales channels through third party distributors.

Data to monitor delivery

Finally on the issue of trust, we have to be confident that what we say to customers is fact. We have been obsessive in using digital data internally to monitor how well we deliver, including analysing the performance of individual devices. We made the decision to invest in embedded system controls that allow us to see remotely how well customers' devices are working over time. The product design benefits alone far outstrip the additional hardware and data costs involved in this system. Not only has the remote connection helped us to optimise design, we can also use it to make rapid changes to individual operating systems by sending messages over the air. In other words, connected devices enable much better service delivery, which in turn leads to increased customer satisfaction and trust.

Customer satisfaction levels

Of course our efforts to understand our customers' needs and to design products and service models that meet those needs are useful only if they lead to satisfied customers. The statistics below from our December 2014 survey demonstrate a high level of satisfaction with M-KOPA and its products.

Statement	% Agreeing
M-KOPA Solar... has helped you save money	97.2%
M-KOPA Solar... has improved your child's/ children's ability to study	97.6%
M-KOPA Solar... makes you feel safer	96.9%
M-KOPA Solar... makes it easier for you and your household to breathe	98.6%
M-KOPA Solar... makes your home more modern	98.2%
M-KOPA Solar... has improved your quality of life	97.9%

Section 3: New opportunities and adjacent markets

Digital technology has provided us with deep insights into how customers use our products and how to improve our service. It also lets us go a step further and test new services. Here are two very real examples.

Extending credit to customers

First, and perhaps the most interesting business opportunity we have unlocked, is the extension of additional credit services to our most credit-worthy customers. The data we gather over time allow us to categorise the best payers and the highest users, identifying those customers to whom we can offer further credit.

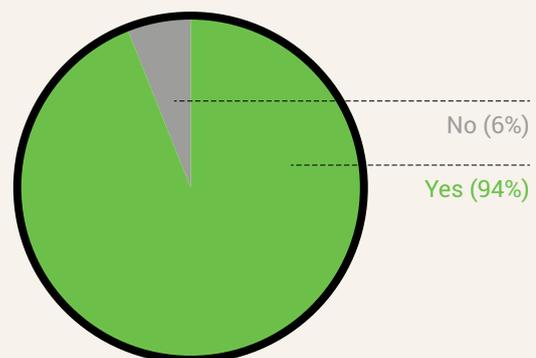
Using digital technology, we are able to remotely re-set the credit level on the customer's SHS and, through this re-set mechanism, we can offer the customer anything from cash back to their M-PESA account to new equipment including a television, a smart phone, a water tank or a clean cookstove. Effectively, customers use their ownership of the SHS as collateral to buy other products and services.

M-KOPA is now one of the largest sellers of clean cookstoves in Kenya. These stoves burn less wood or charcoal for the same heat output and therefore save the customer money. Our data suggest that the payback period for the clean cookstoves is less than 20 weeks.

Our credit extension model is a radical way to provide micro-credit, for which there is a huge demand among our customers. Our smart, asset-backed approach avoids many of the operational constraints of traditional micro-lending models, such as the need for groups, weekly meetings, high interest rates and cash handling. To date, more than 70,000 of our customers have bought an additional product from us. Repayment rates among this group are high, linking back to the issue of trust.

Figure 3: Customer demand for extended credit

Would you be interested in borrowing money from M-KOPA to purchase other assets?



Extended credit supports schoolwork and farming

Lucas Ochieng from Kisumu is one of many customers who have used M-KOPA's additional credit to make further purchases.

"Since I bought an M-KOPA TV, the look on my children's faces when watching TV at home is priceless,"

he says.

"My children can finally relate to what they see in their books at school. Next I would like to buy products from M-KOPA to help with my farming."



We feed our customers' repayment records through to the credit reference bureau in Kenya. Of the records submitted so far, well over 90% have been positive, demonstrating that our customers had completed their purchase agreement with us and are creditworthy. Again, this helps our customers to see the value in the service we provide.

Expanding the use of weather data

Another adjacent sector that we are beginning to explore is the use of weather data. Every SHS has the capability to send and receive weather data and we are currently testing the potential for using the systems as mini weather stations that feed back data on temperature, humidity, solar intensity and even rainfall and soil moisture content. The latter two data points can be gathered by external sensors situated around the customer's property. These sensors communicate over short distance radio frequency back to the SHS and from there to our servers.

Technically, this is very feasible and we are now exploring the business case, looking at links to agricultural productivity, crop insurance or even predictive weather event monitoring.

Conclusion

This paper summarises some of the many ways that digital technology has shaped our existing business model and is enabling us to explore new avenues. At the core of our use of technology is the ability to understand customers more directly, respond quickly to their needs and build trust. We believe that our technology choices and payment models are scalable and we can see an exciting future ahead.

However, it is important to stress that the use of digital technology covers perhaps only 20% of the job that needs doing. The other 80% requires old fashioned, analogue, operational execution.

From checking the quality of components in China, to managing inventory movement through warehouses and into sales channels, and even convincing the customer that this is a good purchase for them – these are the things that are hard to do. These tasks need good people and strong organisational capacity. Get these things wrong and – no matter how powerful the digital solution – there will not be a business.

Acknowledgments

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More information

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