



Wonderkid Multimedia LTD. Digitising water utilities in Kenya



www.gsma.com/m4dutilities

The **Mobile for Development Utilities Programme** improves access to basic energy, water and sanitation services in underserved communities using mobile technology and infrastructure. Our work encompasses any energy, water and sanitation service provided to a community, which includes a mobile component, whether it is voice, SMS, USSD, Machine-to-Machine, NFC, a mobile operator's agent network or tower infrastructure. We aim to seize the opportunity, leveraging mobile technology and infrastructure to enhance access to affordable and reliable energy, clean and safe water and sanitation services in underserved communities. The GSMA Mobile for Development Utilities Programme receives support from the UK Government.

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www.wonderkid.co.ke

Wonderkid is a software development consultancy based in Kenya. They develop bespoke solutions for the public and private sector across Africa. They started working in the water sector in 2012 with the launch of MajiVoice, a customer feedback and complaint management system for water utilities.

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Wonderkid Multimedia Ltd.

6 CLEAN WATER
AND SANITATION



GSMA Mobile for Development Utilities Utility Partnership Grant 2015-2016.
Using mobile to digitally transform water utilities in Kenya

USE OF MOBILE



Mobile payments
Mobile Money



Mobile Services
SMS / Mobile App

Wonderkid developed and deployed a suite of **mobile tools for water utilities** to improve the quality of their customer care and billing services. This included mobile apps for meter reading, operation and maintenance as well as a means for customers to log complaints and query bill amounts by SMS.

Wonderkid worked with **4** water utilities across Kenya improving quality of service for over **500,000** people.

PROJECT OUTCOMES



28% increase in revenue collected and **8%** increase in revenue billed*.



71% increase in the number and **50%** increase in value of mobile money transactions*.



The technology solution was further deployed with a commercial model in **6** new utilities, transitioning from a subsidised model under the grant.

KEY PROJECT LESSONS



Mobile enabled services can improve operational efficiency (such as complaint resolution time, billing efficiency, bill collections etc.) of the water utility, as well as performance of their staff.



Awareness and convenience can initiate a first trial of consumer services, but mobile enabled services need to deliver reliably for sustained adoption by consumers.



Using standard hardware such as mobile handsets as well as mobile money networks makes it easier to replicate the technology solution.



Overview of the grant project

The GSMA M4D Utilities Innovation Fund awarded Wonderkid a Utility Partnership Grant in May 2015. The purpose of the grant was to deploy the Integrated Mobile Utility Management (IMUM) software system with four water utilities in Kenya.

Wonderkid has already developed and piloted different components of this system, initially in 2012 with the complaint management system, [MajiVoice](#),¹ which received support from Kenya's Water Services Regulatory Board (WASREB) and is live in 13 water utilities in Kenya. Following the successful launch of MajiVoice, Wonderkid collaborated with Nairobi City Water and Sewerage Company (NCWSC) to expand the functionality of the system to include a mobile-based apps for meter reading and revenue collection (disconnecting and reconnecting customer accounts). The IMUM system combined the functionalities of

MajiVoice and the meter-reading application into one comprehensive solution.

The grant supported the deployment of Wonderkid's IMUM solution with the following Kenyan water and sanitation companies:

- Kisumu Water and Sanitation Company (KIWASCO)
- Murang'a Water and Sanitation Company (MUWASCO)
- Kakamega Water and Sanitation Company (KACWASCO)
- Malindi Water and Sanitation Company (MAWASCO)

1. <https://thehimalayantimes.com/nepal/khotang-receiving-247-power-supply-solar-grid/>

Service design and use of mobile channels

Like other water utilities in Kenya and around the world, the four utilities selected for deployment had high levels of non-revenue water (NRW). NRW is water produced by utilities that is not billed because of commercial and physical losses, as shown in the utility partner profiles in Table 1. According to WAREB's Impact Report 9, 30 percent of the 84 utilities in Kenya reporting data had more than 50 percent NRW.

During the grant period (May 2015–December 2016), Wonderkid deployed mobile and online applications primarily in response to inefficient information flow for two functions: meter reading and complaint management. It developed a suite of services (using mobile services and mobile money) for various departments within the utility as well as for customers.

TABLE 1

Water utility partner profiles

	Kisumu Water and Sewerage Company (KIWASCO)	Murang'a Water and Sanitation Company (MUWASCO)	Kakamega County Water and Sanitation Company (KACWASCO) ²	Malindi Water and Sewerage Company (MAWASCO)
Area served	Urban and partially rural areas of Kisumu county in western Kenya.	Urban and rural areas of Murang'a county in central Kenya.	Urban and rural areas of Kakamega county in western Kenya.	Urban areas of Malindi and Margarini constituencies north of Kilifi county in coastal Kenya.
Population served	280,462	57,516	238,456	233,334
Accounts (active & inactive) <small>(residential + commercial + institutional connections)</small>	42,305	13,894	28,502	23,094
Non-revenue water (NRW)	49%	38%	53%	27%

Source: Water Services Regulatory Board (WAREB) [Impact Report 9](#)

2. During the grant period, Kakamega Busia separated into two entities. Wonderkid's IMUM service was deployed in both regions, but Busia discontinued use shortly after separation. Separate data on the two new utilities was not available at the time of publication, so NRW is reported for the combined entity. Eighty percent of the population served by the combined entity is attributed to Kakamega. This is based on data that shows 80 percent of accounts (including residential, commercial, and institutional connections) lie in the area administered by Kakamega.

I Meter-reading application for staff and customers

The mobile and online application developed for the utility's meter-reading staff was called Mobile Meter Reading Service (MMRS), and the service for customers was Soma Mita (meaning 'read the meter' in Swahili).

The MMRS, an Android application, allows meter readers to download the meter-reading sheet without having to visit the office. This sheet lists all accounts in a particular area, and when staff arrive at the meter location they can retrieve account details by entering the customer's account number. The meter reading is then entered manually into the application and verified with a photo taken by the smartphone. The application also records the GPS coordinates where the entry was made.

The first version of MMRS was a web browser-based application that relied on various third-party applications to deliver full functionality, such as SureLock, Habit browser, GPS logger, and the Palapa web server. This version was very slow and would occasionally become unresponsive if any of the underlying third-party applications malfunctioned. Based on feedback, Wonderkid upgraded the service to an independent Android app. After the upgrade,

they saw a 96 percent reduction in the number of issues reported by utility staff.

Soma Mita is an SMS-based meter-reading application for customers. Customers can report their consumption by sending an SMS to the utility (see Figure 2), which responds with a provisional bill for that month, including instructions for bill payment using mobile money. The rollout of the application varied for each utility. With KIWASCO, only household meters that had not been read by meter readers before (because the customer was not at home to give the meter reader access) could use this functionality to receive a provisional bill. With MUWASCO, on the other hand, anyone could use the application. If a meter reader had provided a reading, the bill returned to the customer was based on the in-person reading and not on the value reported by the customer.

Bill query was another SMS-based service that customers could use to find out what they owed. Unlike Soma Mita, customers were not required to send their meter reading, rather, they could find out the amount due by messaging their account number. The response SMS, in addition to providing the bill total, also included instructions for bill payment using mobile money.

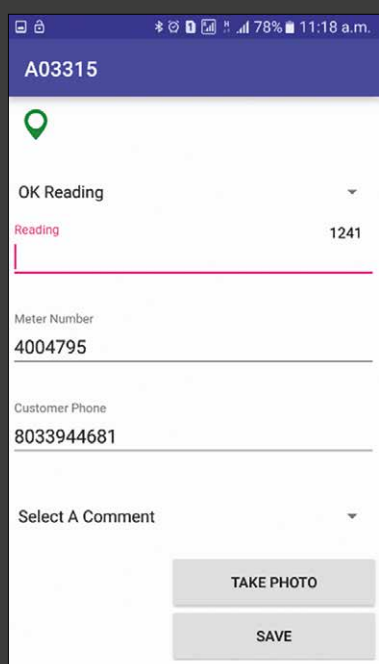


FIGURE 1: SCREENSHOT OF THE MMRS APPLICATION USED BY METER-READING STAFF



FIGURE 2: MARKETING FLYER FOR CUSTOMERS EXPLAINING SOMA MITA

I Complaint management system

Through the IMUM system, customers can report an issue with the utility by sending an SMS, calling customer support, filling in an online form, or visiting the office. All complaints, regardless of how they are received, are logged in the central database and customers are provided with a reference number they can use to track the status of their complaint (Figure 3).

The system provided the customer care team with:

- **Transparency:** Customers could receive timely and accurate updates using the complaint reference number.
- **Traceability:** Staff had an overview of the entire process and could assign the complaint to the relevant department, such as billing, technical, or finance.

- **Accountability:** Staff could accurately monitor the resolution time for each complaint and use this data to enforce the Service Level Agreement included in their customer charter, as required by the Kenyan regulator WASREB.

Wonderkid also developed bespoke solutions to respond to specific challenges the utilities were facing. For example, KIWASCO needed an application for their technical team that allowed the central office to send the list of repairs over the phone instead of asking the team to report to the office every morning (similar to the functionality of the MMRS). Wonderkid enhanced the functionality of the application by adding features, such as ordering inventory, sending updates to the customer care team, and other features that improved overall information flow.



D/B My Tasks Tickets / SRs **Meter Reading** My Team Billing Reports Devices Admin

All Readings Cycle : Aug, 2017 - Cycle 8

Reading Sheet Date & MA Map Search By: Account Number

Zone(s): All Zone(s) Reading Sheet No. [2]

Reading Sheet No.	Reading Sheet Code	Zone(s)	Published On	Downloaded On						Returned & Billable	Marketing Assistant	Device
51	340-005-0	Malindi	Mon, Aug 21, 2017 08:49	Mon, Aug 21, 2017 10:47	421	421	368	368	87.41%	✓ 368 / 368	Kai Fadili	14
151	340-015-0	Malindi	Mon, Aug 21, 2017 08:49	Mon, Aug 21, 2017 09:03	614	614	538	538	87.62%	✓ 538 / 538	Irene Mung'aro	13
211	340-021-0	Malindi	Tue, Aug 22, 2017 15:09	Tue, Aug 22, 2017 15:16	480	480	478	478	99.58%	✓ 478 / 478	Cosmas Wambua	16
41	340-004-0	Malindi	Tue, Aug 22, 2017 08:08	Tue, Aug 22, 2017 08:12	308	308	274	274	88.96%	✓ 274 / 274	Jacob Okumu	20
111	340-011-0	Malindi	Mon, Aug 21, 2017 08:50	Mon, Aug 21, 2017 10:46	263	263	240	240	91.25%	✓ 240 / 240	Elizabeth Kalinga	49
261	340-026-01	Malindi	Wed, Aug 09, 2017 10:15	Wed, Aug 09, 2017 11:06	1446	1446	1431	1431	98.96%	✓ 1431 / 1431	Cosmas Wambua	16
181	340-018-0	Malindi	Mon, Aug 21, 2017 08:59	Mon, Aug 21, 2017 09:04	72	72	70	70	97.22%	✓ 70 / 70	Jacob Okumu	20

Records 1 to 28 of 28

Developed by Wonderkid [Everyday Solutions]

FIGURE 3: CENTRALISED DATABASE FOR COMPLAINTS REPORTED THROUGH VARIOUS CHANNELS HELPED TRACK RESOLUTION

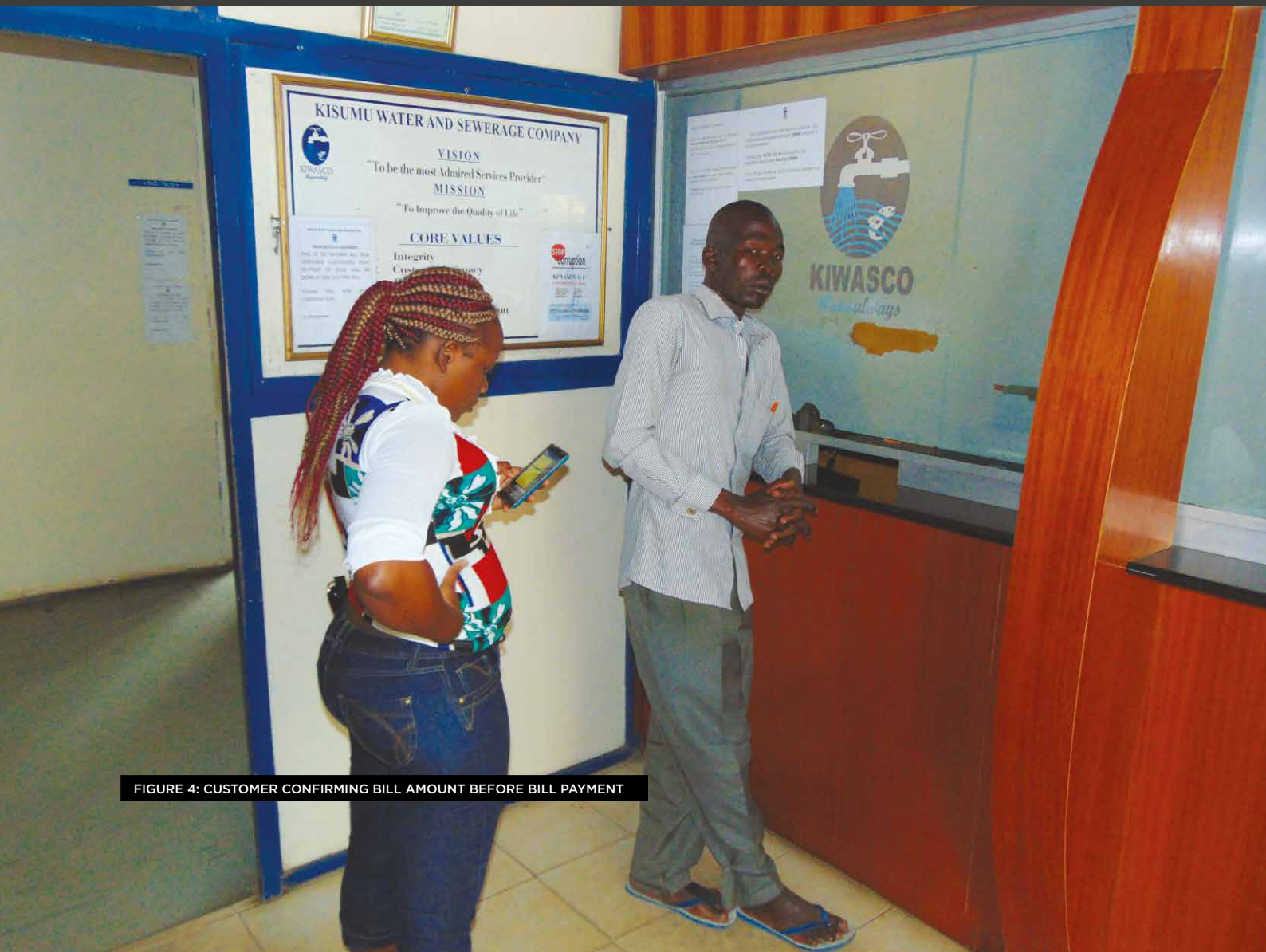


FIGURE 4: CUSTOMER CONFIRMING BILL AMOUNT BEFORE BILL PAYMENT



Lessons from the project

1 | Mobile technology can transform how utility services are delivered, by helping utilities better manage their staff and operations and increase revenue.

The IMUM suite of services, including meter reading and complaint management applications, was deployed at four utilities. For this case study, we only analysed the data from KIWASCO, where data was reported over the longest period and the impact was observable (once growing pains had been resolved). It is important to note that external factors, such as weather and seasonal consumption trends, can affect a utility's supply and demand, and clear trends are only visible after several months.

The impact of mobile on operational efficiencies

Digitisation of manual processes allowed KIWASCO to gain efficiency across different functions. The efficiency of meter readers (calculated as the total number of meters where readings were reported divided by number of meter readers) at KIWASCO increased by eight percent from the launch of the service in August 2015 to December 2016.

A similar trend was visible in complaint management. For KIWASCO, resolution time dropped from more than 15 days in August 2015 to around six days in December 2016. As Figure 5 shows, this is not a short-term phenomenon, but a trend that is visible over time. This highlights a key lesson: that technology is not a short-term fix and can deliver gains through sustained use. It is important for both utility management and service providers to have realistic expectations and be prepared

to wait at least six to eight months (depending on the nature of the solution) to see results.

It is equally important for the service provider to monitor results and provide ongoing support to the utility. The Wonderkid team worked closely with all the utilities. A team member was on-site for several months after the launch of the service to train the staff and help the utilities adopt the system and resolve any issues.

Operational efficiencies lead to higher revenues

The impact of efficiency gains was also visible in revenue growth (see Figure 6). Revenue both billed and collected by KIWASCO increased during the grant period. The new meter-reading system helped meter readers identify new accounts that were consuming water, but were not included in the meter-reading list and, therefore, not being billed. The meter-reading system also made the process more transparent by ensuring the utility had a photograph of the actual meter display. This especially helped to boost collection from commercial accounts that may have been colluding with the meter readers to lower the reported consumption.

The amount of revenue collected increased by 28 percent in a year and a half. After an initial jump in September 2015, a month after launch, revenues declined, bringing to light the various inefficiencies

"[I am ranked high among staff meter readers because of] the shorter time frame I read meters and the quality of pictures taken. The digital system makes work easy, there is less paperwork, it is accurate and eliminates doubts in reading [because supervisors] can counter-check easily. It enhances work output thus I can do 180 readings per day."

METER READER AT KIWASCO



mentioned earlier. Over the next couple of months, however, the KIWASCO team streamlined internal processes to handle these anomalous cases and worked with customers to settle past due bills and clarify any doubts regarding the new meter-reading process. This reaffirms the need for a long-term approach with plenty of support for utility staff.

The increase in the number of billable accounts also validates the theory that improving the operational efficiency of a utility will help to expand service. Since the service was launched, 2,034 new accounts have been opened — an increase of about nine percent on billable accounts.

Data-based performance reviews can help to identify top performers

The management teams at the utilities also wanted to use the IMUM system to improve supervision of their staff and operations. One of the key data points management tracked was daily meter-reading efficiency — that is, the number of readings returned daily from a meter-reading sheet.

Initially, meter readers were concerned that more supervision would hamper their work. Management addressed these concerns by explaining it would help the meter readers' supervisors provide better support and identify the top-performing meter readers.

The KIWASCO team took this a step further and developed a performance reward matrix based on the IMUM system. Using set criteria, the meter-reading team, technical team, and complaint management team were each awarded a performance bonus (Figure 7).

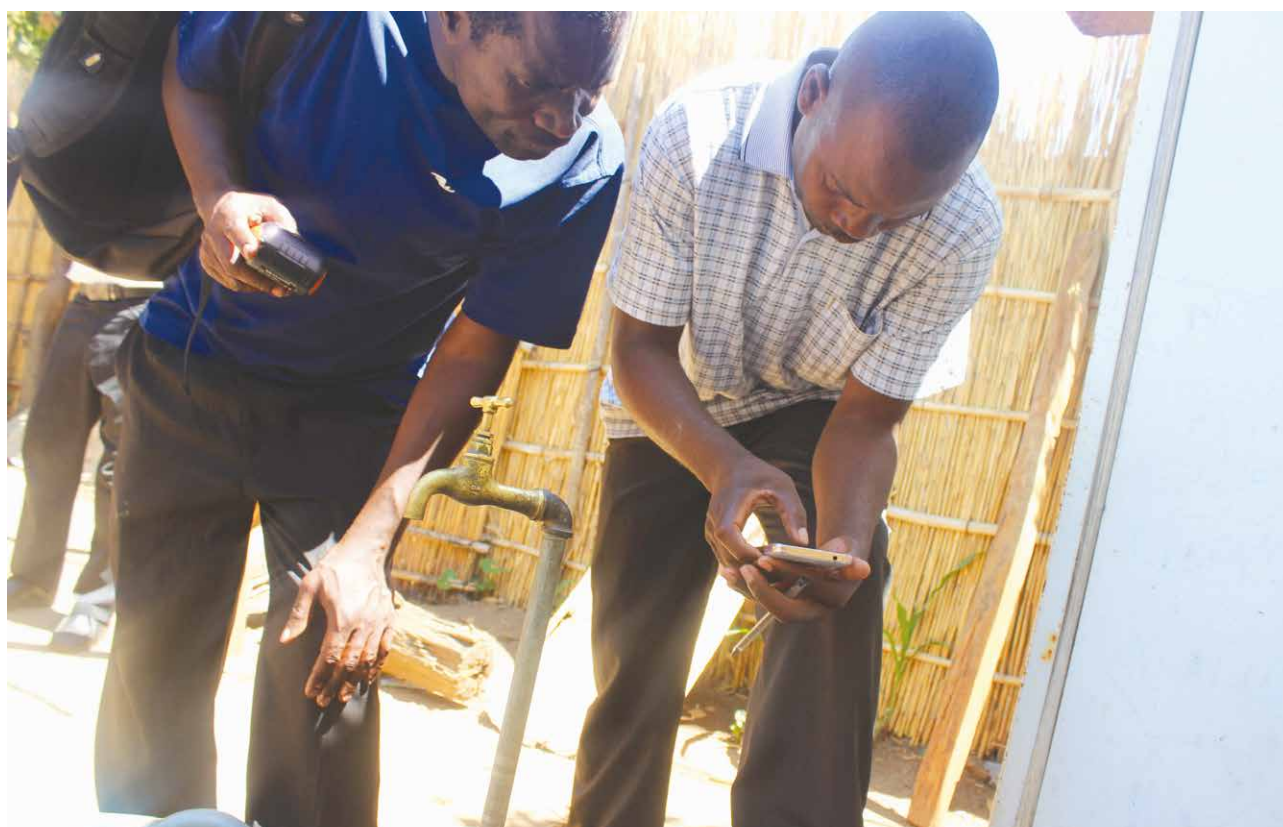


FIGURE 5

KIWASCO's complaint resolution time gradually declined

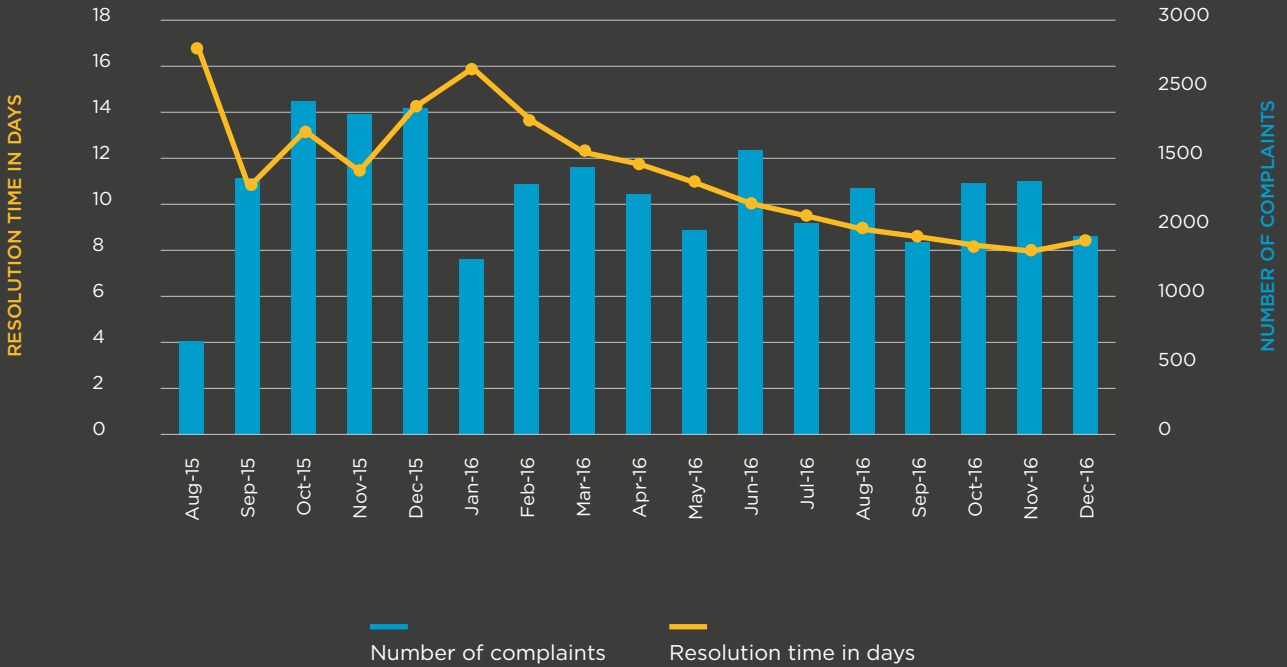


FIGURE 6

Increase in revenue both billed and collected by KIWASCO

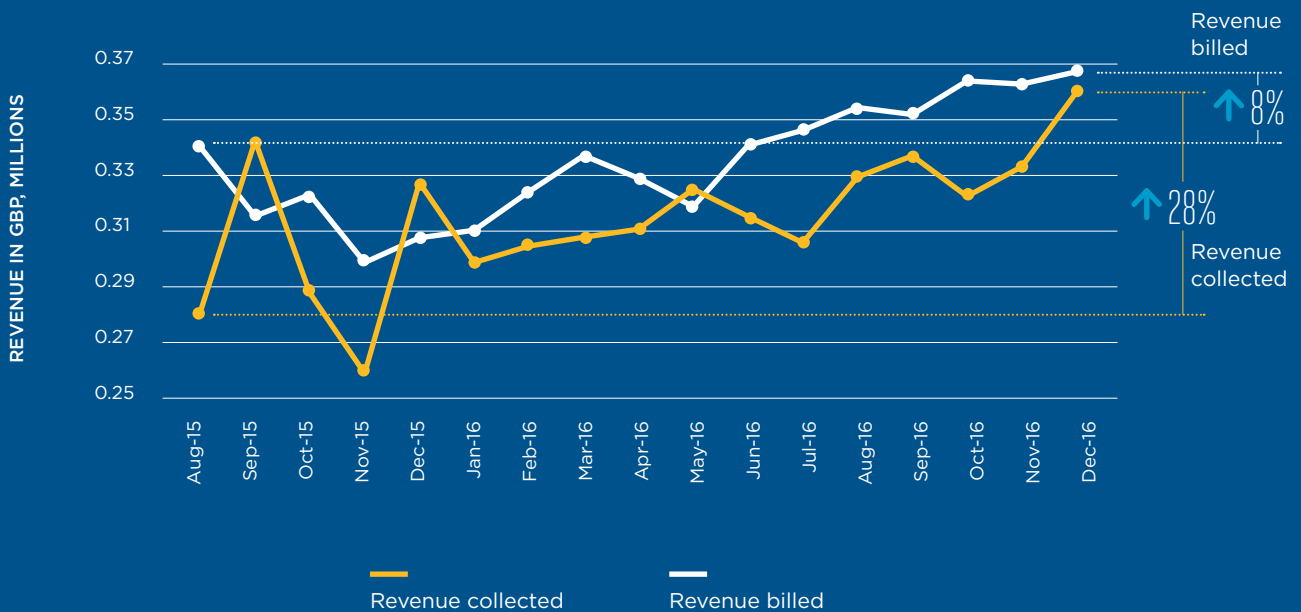




FIGURE 7: A DASHBOARD ALLOWS THE CENTRAL OFFICE TO MONITOR PERFORMANCE OF METER-READERS.



FIGURE 7: METER READER PRACTICING TAKING PICTURES DURING THE METER READER TRAINING AT KIWIASCO

2

Awareness and convenience can encourage customers to try a mobile-enabled service, but sustained adoption depends on delivering it reliably

The IMUM system attempts to simplify how customers interact with their utility by providing mobile-enabled services as an alternative to visiting a physical centre to report complaints or receive and pay bills. For their own staff, the utilities were able to mandate use and immediate adoption of the mobile-enabled tools even though the results may have been delayed. For customers, however, these tools were optional, and adoption depended on the utility raising awareness of the services and providing support to use them.

Ensuring customer adoption is a long-term endeavour

To popularise reporting complaints using SMS, KIWASCO launched a low-touch campaign that promoted the service on flyers and posters at the utility office, and by word of mouth when staff interacted with customers in the field. With this approach, it took about 6 months for complaint reporting to shift to SMS as the predominant mode of reporting. Once the transition was complete, the number of complaints reported via visits to the customer service centre remained at around 300 complaints per month

irrespective of the total number of complaints (see Figure 9). According to staff, these customers had an additional reason for visiting the centre and chose to report in person while they were there. Nonetheless, the transition was beneficial for both the utility and customers, as both saved time and effort in reporting complaints.

To increase usage of billing-related services (Soma Mita and Bill Query), KIWASCO tried a high-touch campaign in addition to raising awareness through flyers and staff. In November 2015, a focussed door-to-door campaign was rolled out to inform customers of various services. This led to a sharp increase in usage of both Soma Mita and Bill Query (Figure 10). Both services promoted the use of mobile money by providing customers with instructions. However, this did not result in sustained use of either the applications or mobile money, indicating that awareness can encourage a customer to trial a service, but it does not necessarily change a habit. Instead, customers need continued reminders, such as including the PayBill number and payment process on both the paper and SMS bills.



"Previously, logbooks were used and a lot of documentation and filing [was done; these were then] dispatched to different offices [and field zones]. It was quite a process compared to now — complaints are logged first on the computer then passed on to the right person for action [via computer or mobile phone], which is fast and direct."

CUSTOMER CARE STAFF, KIWASCO

There is still scope to grow mobile money payments for utility services

Between August 2015 and December 2016, the number of mobile money transactions to pay bills at KIWASCO increased by 71 percent and there was a 50 percent increase in the value of the transactions. This is significant, especially in Kenya, where mobile money has been widely adopted and has been available for utility payments for several years.

The IMUM system managed to increase mobile money usage by closing the information gap through new services like Bill Query and Soma Mita. Bill Query was launched in September 2015 and Soma Mita in October 2015, providing a convenient way for

customers to find out their bill amount, the utility's PayBill number, and how to remit payment via mobile money. According to an endline survey of KIWASCO customers conducted in September 2016, over 60 percent of respondents agreed that if they received an SMS bill, they were likely to pay it using mobile money, citing such reasons as, "It is a reminder" or "[The] convenience of using mobile money".

However, there is still a significant awareness gap for these services. The general population survey found a low level of awareness of various consumer services. Further investigation revealed that utilities had limited marketing methods and reach. Most respondents to the qualitative survey recalled being informed of these services by a flyer from a utility office or staff.

FIGURE 9

Decrease in the number of complaints reported at KIWASCO's customer service centre

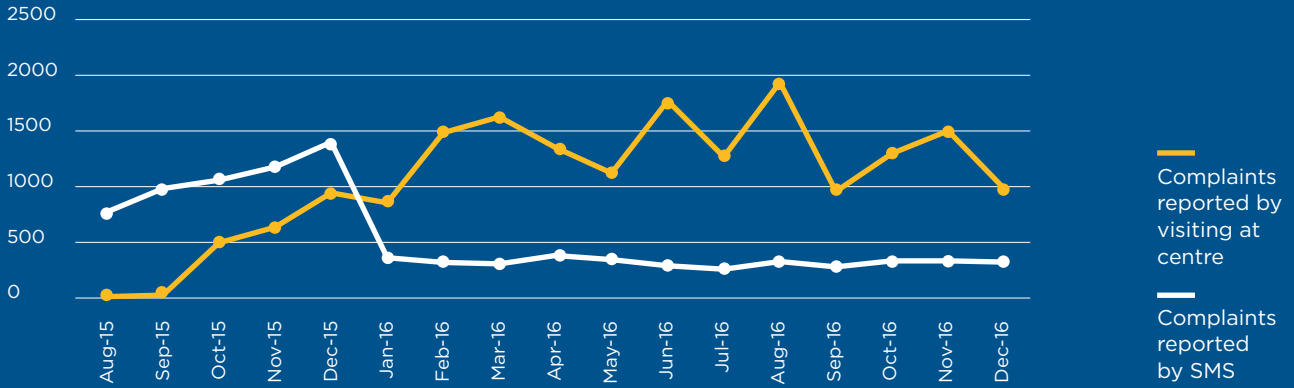
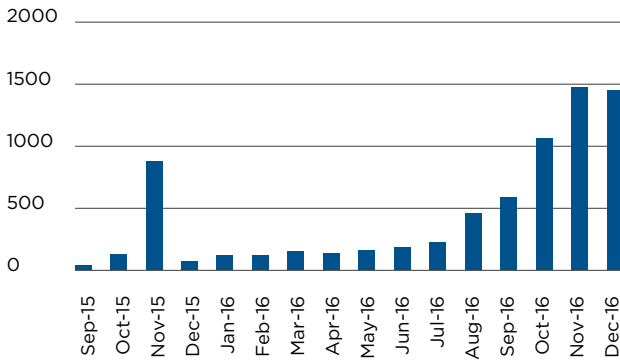


FIGURE 10

A sharp increase in service usage due to a focussed marketing campaign

BILL QUERY REQUESTS AT KIWASCO



UNIQUE SOMA MITA USERS AT KIWASCO

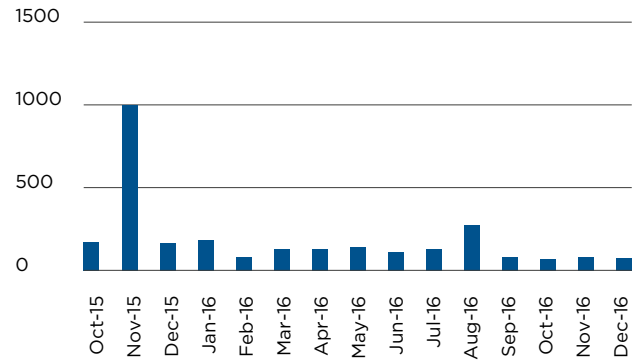
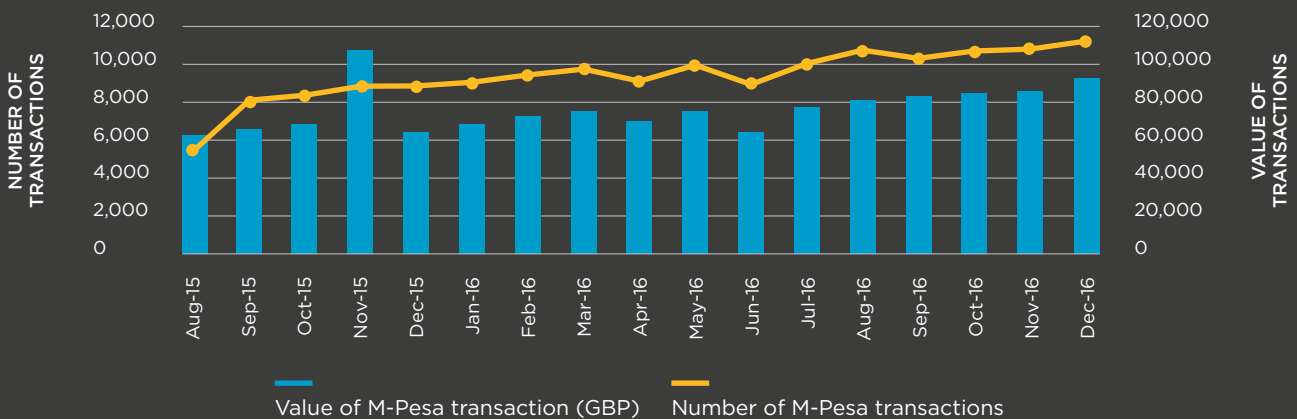


FIGURE 11

Growth in mobile money usage at KIWASCO



3

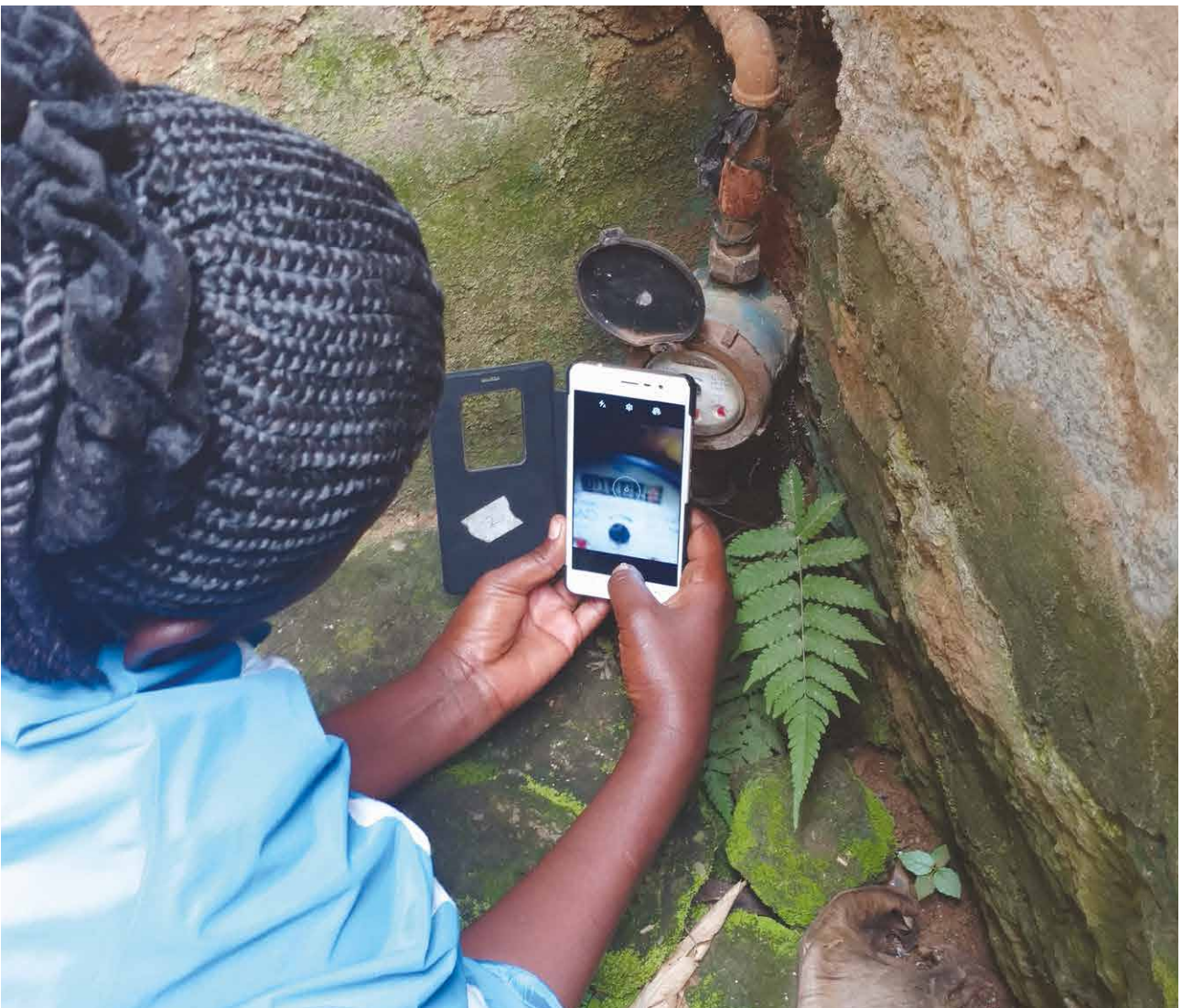
Mobile technology can provide a foundation for replication and growth

Wonderkid took five months to deploy all the services with the first utility (services were launched one at a time). By the time Wonderkid had deployed the solution with the fourth utility, they were able to reduce this lead time to one month and launch all the services simultaneously.

This reveals not only a sharp learning curve for Wonderkid's team, but also the advantages of its approach. Wonderkid uses standard Android handsets and existing infrastructure (GSM, mobile money network, cloud hosting, etc.) to deliver its solution, which makes it easier to replicate.

Advantages of using standard mobile technology and infrastructure as a foundation:

- **Reduced capital expenditure** – Utilities were only required to purchase smartphones for their staff since the apps were designed to upload data to the cloud server over a 2G or 3G network and did not require broadband connectivity. This helped to reduce costs, as the utility did not have to invest in custom-built hardware (e.g. bespoke meter loggers) or physical servers to store information. Similarly, to collect payments digitally, utilities leveraged the existing mobile money network



instead of setting up their own wallet or payment collection centres.

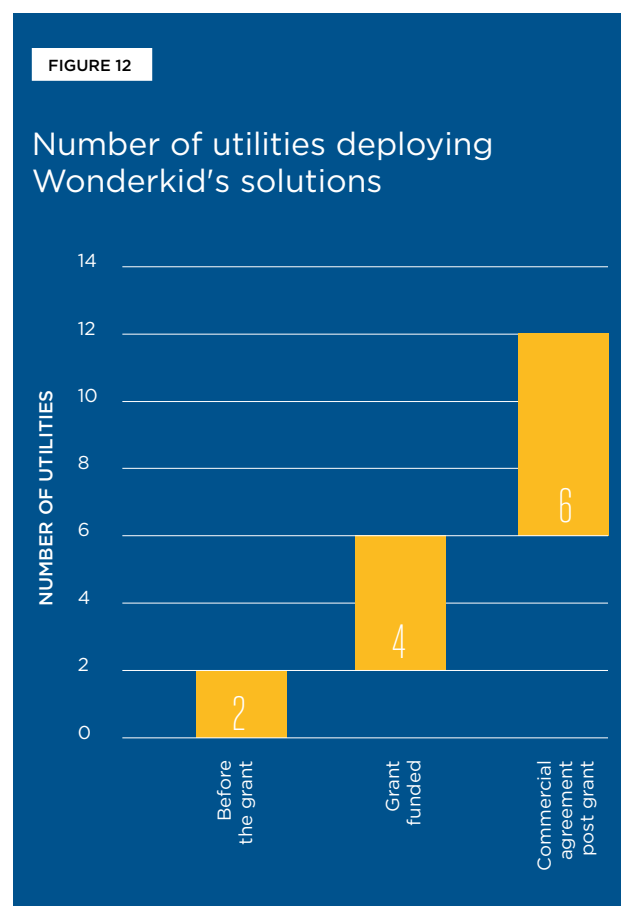
- **Lean and responsive operations** – As staff were already familiar with smartphones, little training was needed to on-board them to the new system. Compared to custom hardware the utility had previously used, such as GPS trackers to identify the location of a leak, a smartphone required fewer spares and maintenance support was readily available in-country. A smartphone app can also be easily upgraded through an over-the-air update (as mentioned earlier, Wonderkid transitioned from a web browser application to an independent mobile app).

Utilising existing mobile money networks and mobile coverage, rather than broadband or Wi-Fi, is a lean way for utilities to adopt technology, compared to the traditional approach of investing in hardware and proprietary software. This approach allowed Wonderkid to scale their solution, both by deepening their engagement with existing utilities and expanding to new ones.

Replicating the solution beyond the grant-funded project

One of the clearest signs the solution is having an impact is the acceptance beyond the grant-funded deployments. In addition to the four Kenyan utilities that Wonderkid supported through the grant, it has also deployed the solution with 6 new utilities,

transitioning from a subsidised grant model to a commercial model. 3 of the 6 utilities are in Kenya, and it has taken the solution to other parts of the continent as well, working with utilities in Malawi and Nigeria (Figure 12).



The champion effect

It is important to note that KIWASCO has played a significant role in other utilities adopting Wonderkid's IMUM solution. KIWASCO management has not only shared the impact of the deployment publicly, lending credibility to Wonderkid's solution, it has also [openly shared](https://www.standardmedia.co.ke/mobile/article/2000179553/water-meter-reading-app-developed-to-minimise-complaints)³ its experience with other utilities, hosting staff from other utilities and making presentations at forums to share its lessons.

"This [Wonderkid's IMUM platform] is a versatile programme that will help change the quality of meter reading by making it more accurate. This will in turn result in fewer complaints and improve our customer relations."

ENG DAVID ONYANGO , MANAGING DIRECTOR, KIWASCO

3. <https://www.standardmedia.co.ke/mobile/article/2000179553/water-meter-reading-app-developed-to-minimise-complaints>

Recommendations

FOR MOBILE NETWORK OPERATORS



Marketing support can drive mobile money usage. Data from Wonderkid's work with KIWASCO indicates that even when customers are aware they can use mobile money, they may not necessarily take advantage of it. Developing user-friendly services that guide them through the process and fill in knowledge gaps can help drive adoption. However, this awareness needs to be cultivated in a sustained manner. MNOs and utilities have an opportunity to collaborate on this, as utilities offer a strong use case for mobile money (regular payments for an essential service) and MNOs have the marketing capabilities to spread the message. Both would gain from the partnership: utilities can receive timely payments that help with cash flow and MNOs can expand their user base. It also benefits customers, who can save penalty charges, from late payments, and effort given the extra time and cost it takes to go to a service centre to make payments.



Creating bundled enterprise solutions for Utilities. Utilities may be able to use several services provided by MNOs across their value chain. Procuring these services individually can be both time-consuming and expensive for utilities, and may act as a deterrent. Also, utilities may not be aware of an MNO's various service offerings, and offering them in a single bundle (handsets, data, broadband, device management, mobile money integration, bill management application for customers, USSD integration, SMS packs, short code, etc.) can help drive uptake for utilities.

FOR WATER SERVICE PROVIDERS



Measure the right metric. NRW is a complex metric affected by various internal and external factors, and technology solutions typically target only a couple of them. To understand the impact of the intervention, service providers should work with utility management to identify which metric can help to determine whether the deployment is performing as expected. For example, during a discussion with the utility management team, Wonderkid identified meter-reading efficiency as a key metric. In the initial months of deployment, the utility's management team and Wonderkid focussed on accurately measuring the efficiency of meter-reading rather than tracking NRW.



Change the management approach to technology deployment. The disruption caused by technology is quite often underestimated. Service providers should be sensitive and responsive to the needs of various stakeholders. In the case of a utility, stakeholders are not just customers and management teams, but also the various staff in the field, and it is important to communicate transparently across the ranks. Staff should be trained to be conversant with the new system, and this training should be followed up with ongoing engagement and feedback from the team.

Appendix

Methodology

Monitoring and evaluation methodology and design provided by Alexandra [Tyers of Tyers Consulting](http://www.alexandratyers.com/).⁴

All data from this case study is primary data and sources include:

- Telephonic quantitative baseline survey conducted with customers in June 2015 for KIWASCO and February 2016 for MUWASCO, sample size of 196 and 227 individuals respectively.
- Telephonic endline survey conducted with customers in August–September 2016 with the same respondents as the baseline survey. The sample size for the endline survey was 199 for KIWASCO and 229 for MUWASCO.
- Operational monitoring data from June 2015 to December 2016 was collected from the IMUM platform and billing backend.
- An independent third-party qualitative evaluation conducted by [Havis Research](https://www.linkedin.com/in/havis-research-company-25444045/?ppe=1),⁵ a research agency based in Nairobi, consisting of:
 - » Self-meter reading (customers): four in-depth interviews, three focus group discussions
 - » Complaint management (customers): four in-depth interviews, one focus group discussion
 - » Mobile meter reading (staff): four participant observations
 - » Complaint management (staff): four participant observations

The research methods and data gathered are as robust as possible, but are not intended to be part of an exhaustive, academic study. Rather, we have taken a pragmatic approach to recording the impact of the mobile service on beneficiaries, capturing early-stage data and insights to help GSMA grantees improve their business performance, and generating knowledge for GSMA and the wider mobile ecosystem on the business case for using mobile innovations for energy, water, and sanitation services.

With this, we recognise some limitations of the data: capacity and budget restraints mean that most quantitative field data has been collected and analysed in-house by the grantee (who are not research professionals) and relies primarily on self-reported responses by users/beneficiaries; the sample sizes are statistically significant where possible, but statistical analysis has not been applied; and some commercial data has been difficult to obtain from mobile operator systems.

4. <http://www.alexandratyers.com/>

5. <https://www.linkedin.com/in/havis-research-company-25444045/?ppe=1>



For more information on the Mobile for Development Utilities programme visit: www.gsma.com/mobilefordevelopment/programmes/m4dutilities



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