



Loowatt Digitising the container-based sanitation value chain in Madagascar



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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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Pictured on the front cover Jérôme Rakotondrasolo.

Loowatt

loowatt.com

Loowatt designs and deploys waterless toilets that use a film liner to contain waste and its odours. It began serving toilet customers in Madagascar in late 2012, with a pilot public toilet and treatment system producing energy and fertiliser. It has rolled out its waste-to-value urban sanitation pilot system to 100 households in Antananarivo.

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Loowatt Ltd.

GSMA Mobile for Development Utilities Seed Grant 2015-2017.
Using mobile tools to support the provision of urban sanitation services in Madagascar.

USE OF MOBILE



Mobile Payments
Mobile Money



Mobile Services
SMS / Mobile App

Loowatt, in partnership with Airtel Madagascar, used mobile technology to support the service and maintenance of **100 waterless household toilets.** Customers used mobile money to pay for collection services and SMS to schedule collections and maintenance. Loowatt personnel used the mobile app and web platform to manage operations and track waste from households to the treatment facility.

The mobile tools supported the provision of sanitation services for **600** household toilet users.

PROJECT OUTCOMES



Usage of mobile money peaked at **26%** of Loowatt customers.



The mobile app improved data visibility and transparency to enable real-time tracking of waste collection, transport and safe disposal.



"Now we know precisely who needs emptying, and our collector does not waste time going to customers who don't need it."
- **Loowatt staff member.**

KEY PROJECT LESSONS



Mobile is a fundamental building block to enable future scale in decentralised sanitation models involving faecal sludge collection and transport, and to ultimately support SDG 6.



Driving mobile money adoption requires a constant push starting with awareness building and providing support during the first few months of usage.

Loowatt is working with other members of the Container Based Sanitation Alliance to develop an open source platform that can be used widely.



Overview of the grant project

Loowatt designs and operates waterless flush toilets that use a polymer film liner to contain waste and odours. Its logistics team regularly collects waste and replaces the film liners with new refills purchased by its customers. The waste is then transported and treated in an anaerobic digester that Loowatt has installed and operates, converting waste into biogas and fertiliser.

In 2015, Loowatt was awarded a grant from the GSMA Mobile for Development Utilities programme to

develop a suite of mobile services to track its waste collection processes, collect payments with mobile money and communicate better with its customers. To provide efficient and cost-effective collection and customer service, Loowatt required these digital tools to ensure waste was collected from households and treated, as well as provide a convenient way for customers to pay for refill liners (essentially a toilet service fee) and schedule collections.



FIGURE 1: LOOWATT'S WATERLESS FLUSH TOILET, WASTE COLLECTION, TRANSPORT AND TREATMENT AT ITS DIGESTER



Photo credit: Loowatt, GSMA

Service design and use of mobile channels

As part of the grant, Loowatt developed three mobile services:

1. A mobile app for waste collectors and an associated dashboard for office staff;
2. Mobile money payments for customers to purchase toilet refill liners; and
3. A free SMS number for customers to schedule collections or request maintenance visits.

| Mobile app to track toilet servicing

Loowatt partnered with software development company Acrea,¹ based in Switzerland, and Every Interaction,² a user interface consulting company, to design and develop an Android-based mobile application that could be used to scan QR codes attached to refill liners, toilets and barrels, and to input barrel weight data.

Toilet servicers used the mobile app for the following:

- Displaying the list of customers requiring toilet servicing for the day;
- At each customer site, scanning the full barrel collected as well as the empty barrel fitted at the customer's home; and
- Entering the weight of the full barrel collected.

Once full barrels were received at the treatment centre, staff would scan them again and enter the weight.

The objective was to ensure that waste was safely delivered to the treatment site and disposed of by comparing the weight at collection with the weight at delivery to the digester site.

The mobile app sent information using mobile data (3G) to the cloud, which the server then displayed on the dashboard. Loowatt office staff had access to the web platform to consult information on collections, create (or import) customers, enter their location and other KYC information. The Customer Service Manager (CSM) was responsible for selling refills, collecting payment and overall customer support and satisfaction. When the CSM collected refills from the office staff, she used the mobile app to scan the refill QR code and did this again when refills were delivered to the customer.

Figure 2 illustrates Loowatt's processes in the sanitation value chain, and screenshots of the mobile app and web dashboard are displayed in Figure 3.

FIGURE 2

Loowatt's sanitation value chain processes

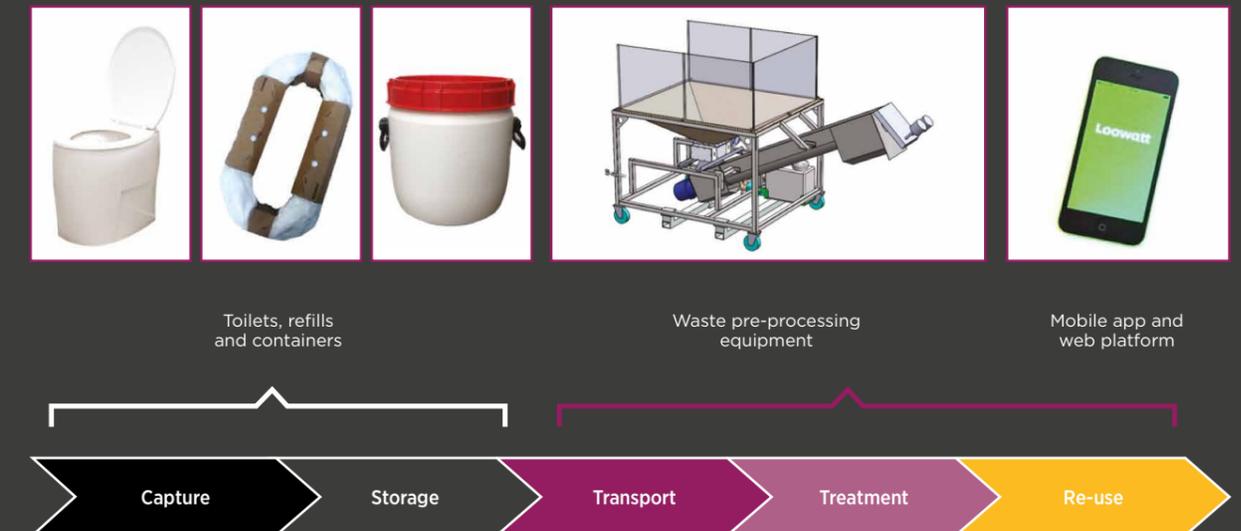


Photo credit: Loowatt, GSMA. Pictured Rodeo Anicet Fiononana (left) and Jérôme Rakotondrasolo (right).

1. <https://acrea.com/en/>
2. <https://www.everyinteraction.com/>

FIGURE 3

Screenshots of Loowatt’s mobile app and web dashboard

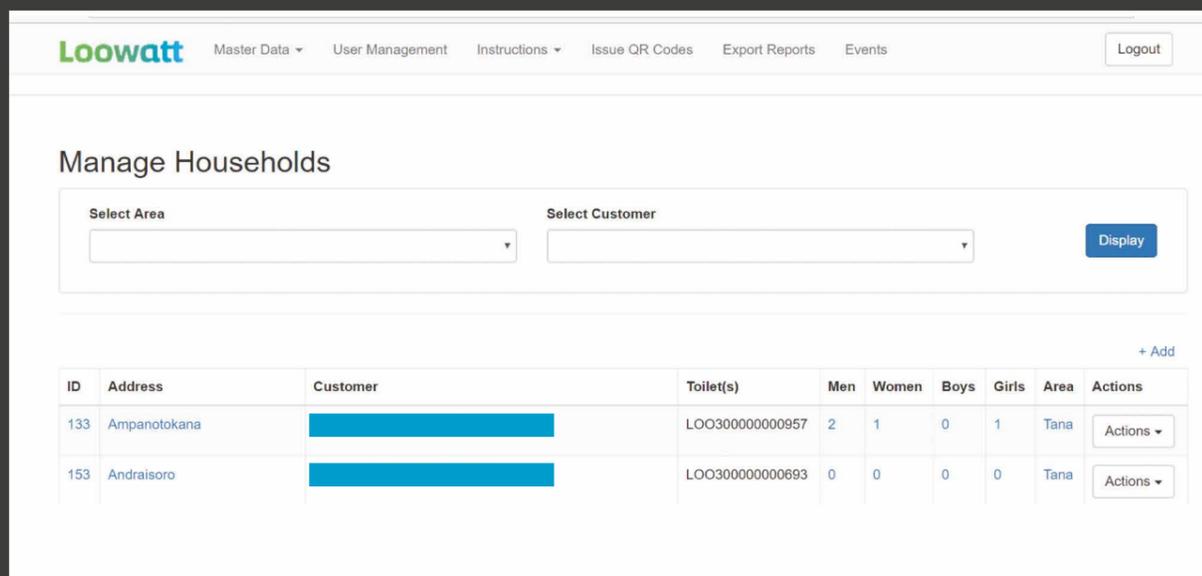
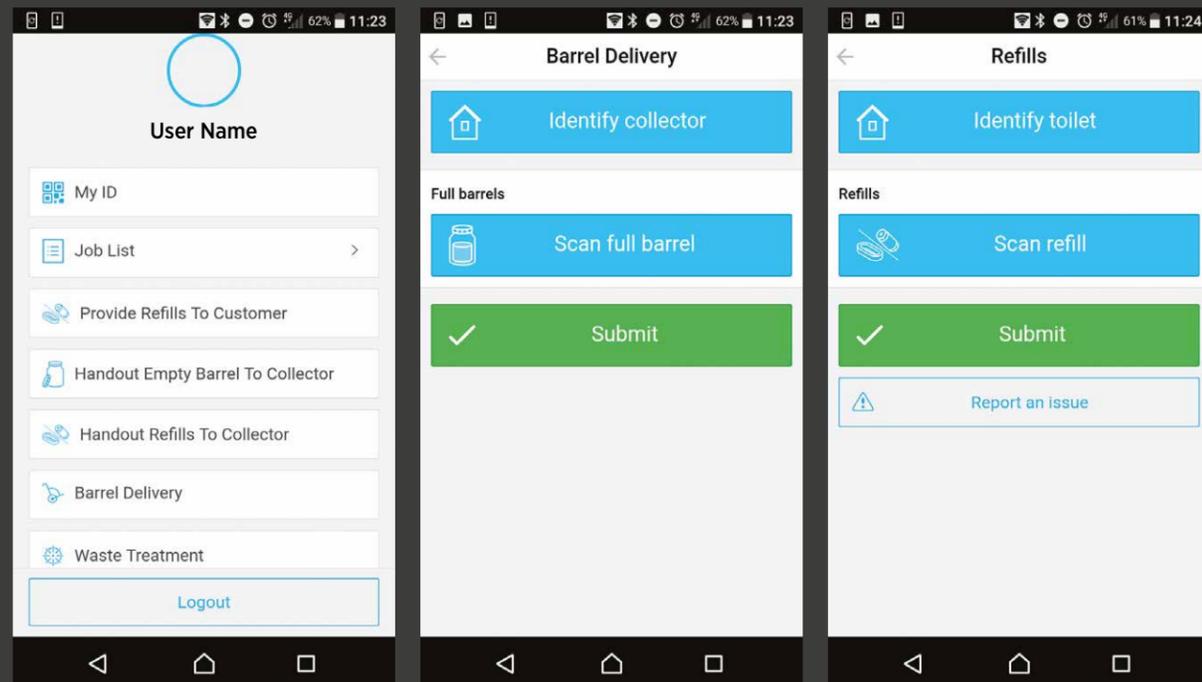


Photo credit: Loowatt

Mobile money improves the visibility of customer payments

As Figure 4 illustrates, mobile money penetration in Madagascar is still limited.

Despite low levels of account ownership, one of Loowatt’s objectives was to digitise customer payments, which would reduce cash handling, improve security and increase efficiency. Having payment visibility and being able to increase the number of customers that each CSM could support would reduce the amount of time they spent on cash transactions.

Airtel Madagascar, Loowatt’s mobile network operator (MNO) partner on this project, set up Loowatt as both an “Airtel Money cash point,” i.e. a mobile money agent, and as a biller. Loowatt customers could pay for refills by making a Loowatt bill payment by USSD on the Airtel Money platform. As transaction information for the payments was not integrated with Loowatt’s accounting systems and web dashboard (mobile payments were made available a few months after the mobile app and dashboard had been designed, developed and launched), office staff had

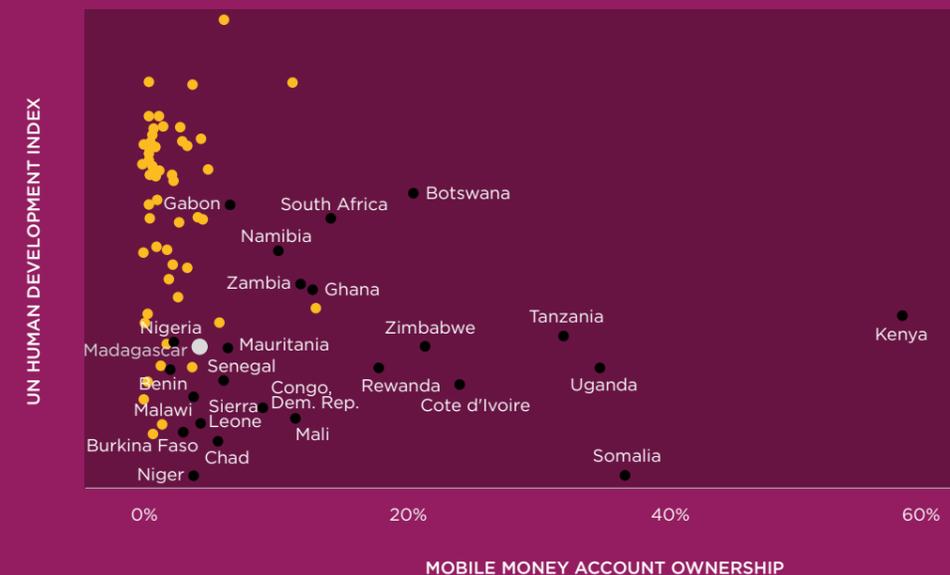
to track payments separately using the web interface provided by Airtel.

To drive mobile money adoption, Airtel Madagascar and Loowatt took the following steps:

- Free cash-in and bill payment transactions were provided by Airtel (this is not unique to Loowatt customers);
- Loowatt customer service staff became mobile money agents, registering Loowatt customers to Airtel Money (providing Airtel SIM cards where required) and providing cash-in services;
- Customers were trained by Loowatt and provided with printed instructions on how to use the mobile menu to make payments to Loowatt; and
- Follow-up support was provided by the CSMs on household visits to help customers with any mobile money-related issues.

FIGURE 4

Mobile money account ownership

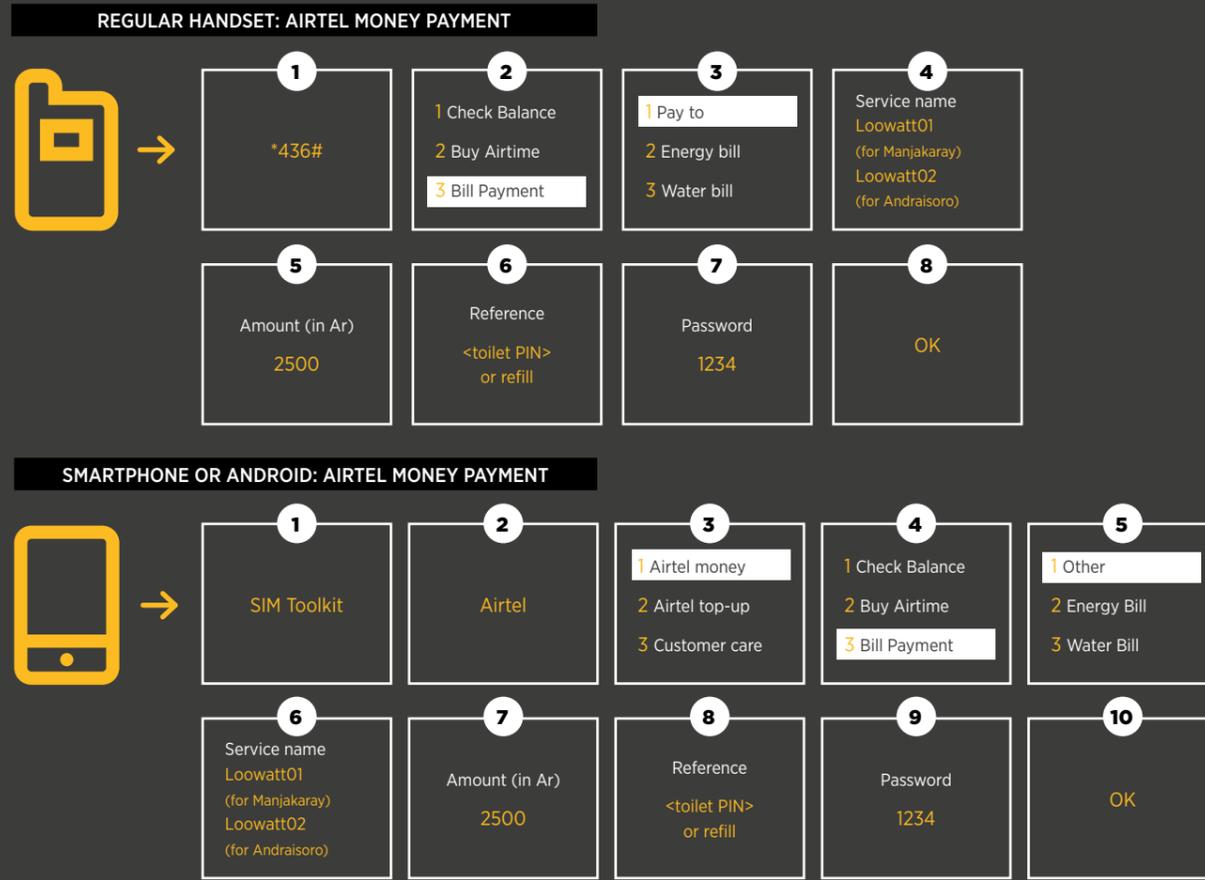


Source: US Global Development Lab³

3. US Global Development Lab, Fall 2017, "Rapid Assessment Framework: Pay-As-You-Go Solar as a Driver of Financial Inclusion", https://cleaneenergysolutions.org/sites/default/files/documents/paygo_oec_deck_amy-paul_craig-jolley.pdf

FIGURE 5

Loowatt's customer payment process



Free SMS number for customer feedback

Loowatt also offered a free way for their customers to request new refills or toilet servicing if the toilet was full or needed maintenance. Airtel Madagascar provided a free SMS-to-email service, while Loowatt paid for the SMS traffic generated. SMS requests were shown in the web dashboard.

FIGURE 6: CUSTOMER CARD WITH THE TOILET IDENTIFIER AND INSTRUCTIONS FOR THE SMS HOTLINE



Lessons from the project

1 Driving mobile money adoption requires a constant push and a careful consideration of the customer value proposition

The mobile money payment functionality was launched in June 2016, and by November 2016 had reached peak usage of 26% of customers using mobile money to pay for 27% of refill purchases. Figure 7 shows the number of households with a Loowatt toilet, trained on mobile money, registered with an Airtel Money account, paying with mobile money, and the percentage of refill purchases made via mobile money. At the time of the baseline survey, only six of the 31 respondents were registered mobile money users and only three of these were using Airtel Money. By March 2017, all households had an Airtel Money account and had been trained to use mobile money.

Customers using mobile money experienced the following challenges:

- **Difficulty in opening, validating and resetting an account**
As new Airtel Money agents, Loowatt staff were unaware that after a customer created an account they had to follow up with a call to their Airtel Money contact or send the customer to visit an Airtel store. This resulted in accounts being blocked shortly after being set up. Furthermore, if customers forgot their PIN code and were locked out of their Airtel Money accounts (after three unsuccessful attempts), they were required by regulation to visit an Airtel store and provide a copy of their identity card certified

by the municipal government. This led to many customers simply setting up a new account or abandoning mobile money altogether.

- **Number of steps in the mobile money transaction**
Using the USSD menu to make a payment to Loowatt required several steps, and the session often timed out as inexperienced customers took too long to navigate the menu and type out alphanumeric strings such as "Loowatt01" for the service name and their toilet PIN identifier.
- **Distrust and fear**
Customers were wary of sending money to the wrong account and having their toilets taken away from them as a result. They also would have preferred to receive a payment confirmation from Loowatt, not just from the Airtel Money platform.
- **Lack of perceived value**
Not seeing the value in using mobile money, customers became frustrated and unwilling to work through these challenges. Since Loowatt staff, waste collectors and customer service managers were visible in the community, available and easy to reach, customers did not understand why they should make the effort to use mobile money when they could easily hand over cash to someone in person instead.

To overcome the challenges above and increase mobile money adoption, Loowatt's Customer Service Managers have supported their customers in using mobile money, with one CSM working particularly hard in the field in November 2016, which explains why usage peaked that month.

Loowatt also changed the toilet PIN code to numbers only to reduce the number of key strokes and the likelihood of a timeout, and printed easier instructions showing the entire USSD string to be entered.

Loowatt is also looking closely at how their mobile money education can be improved, including publicising use cases for mobile money besides refill

payment. For example, only two Loowatt customers had used mobile money to pay the Jirama (the local electricity and water provider).

Loowatt is also considering incentives such as discounts or rewards for payments made by mobile money to drive adoption. In November 2017, it will be launching a six-week campaign offering a week of free toilet servicing for customers who pre-pay their weekly service and an additional free week of servicing if they complete all payments by mobile money. These incentives could be partially funded by the commissions Loowatt receives as a mobile money agent from Airtel Money registrations and cash-in transactions.



FEEDBACK ON THE MOBILE MONEY EXPERIENCE FROM CUSTOMERS AND LOOWATT STAFF:

"I already have difficulties writing a SMS, so how do you want me to go through all these steps?"

- LOOWATT CUSTOMER

"At the beginning, they didn't mind going back to the home menu, but they finally get tired when they are repeatedly sent there."

- LOOWATT STAFF

"They should give a paper receipt or something justifying that we actually did the payment."

- LOOWATT CUSTOMER

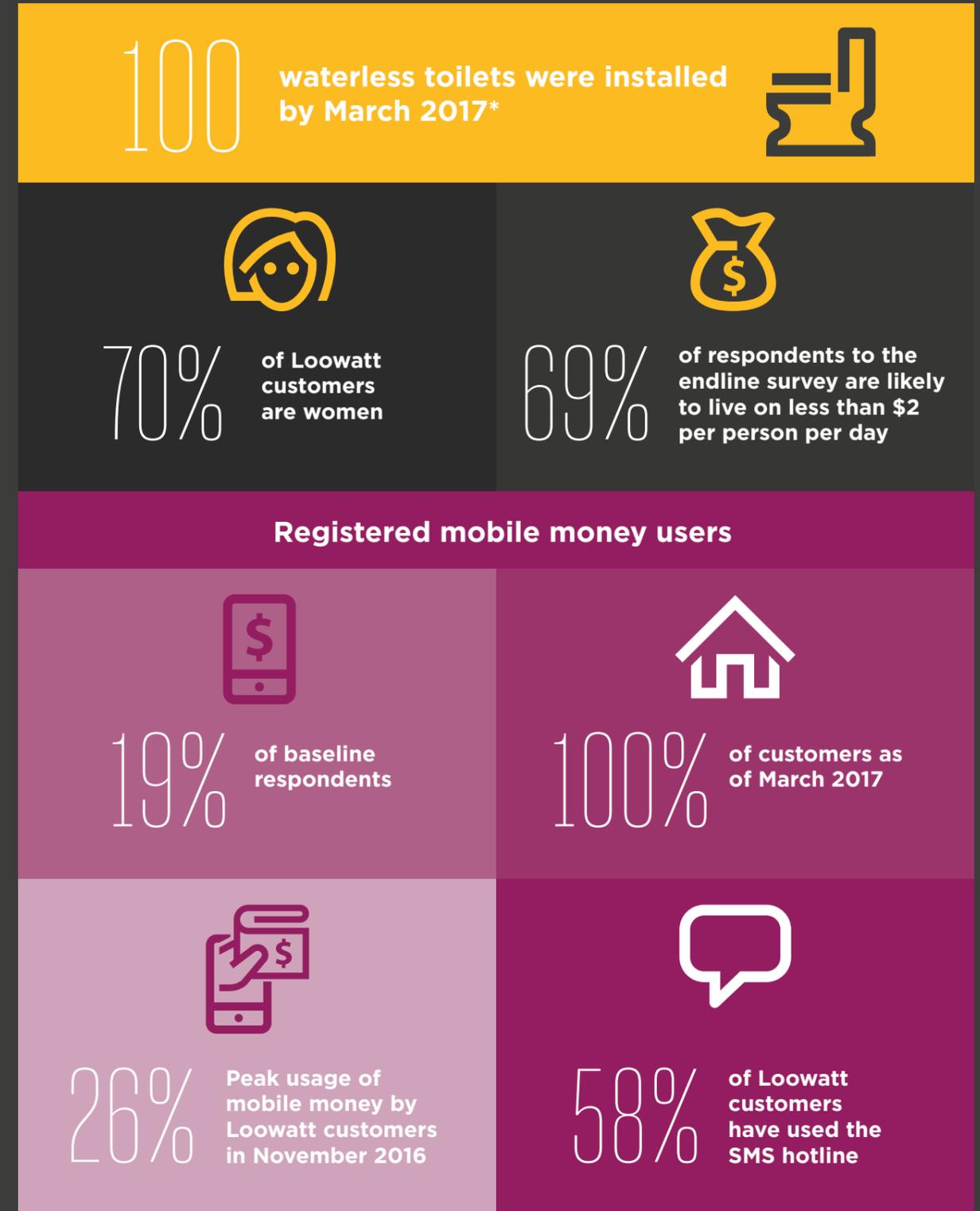
"When no Loowatt staff member comes to pick the refill's payment, I just send the money via Airtel Money."

- LOOWATT CUSTOMER

Photo credit: GSMA. Pictured Lovasoa Vivienne Rasoarinoro.

In general, the same issues plagued the SMS hotline. 56 out of 97 customers had used it and an average of 33 messages per month were received by March 2017. While customers appreciated that it was free to

use and available on weekends outside of Loowatt office hours, it was only the last resort after directly reaching out, calling or even visiting Loowatt's treatment site.



* Note that three toilets were either returned by customers who had churned, or were broken.

Source: Loowatt

FIGURE 7

Evolution of mobile money adoption among Loowatt customers



Source: Loowatt, Airtel Madagascar

2 | Mobile is key to scaling operations

While more effort is needed to adapt digital payment and feedback tools to meet the needs of customers and create the right value proposition for them to overcome their reticence about using the technology, Loowatt found there was significant value in using mobile tools, even in a small-scale pilot.

Benefits linked to the use of mobile money included visibility of payment collection and, to a certain extent, Customer Service Managers' activities as they were still physically present to assist customers with mobile money payments. Although transactions were not yet automatically integrated in Loowatt's back-end systems, the digital records could be utilised. In particular, Loowatt is interested in exploring payment activity by gender as 70% of its customers are female.

The initial objective of the mobile app was to track waste from the household to the treatment centre and ensure it was safely disposed of by comparing the weight at collection with that at delivery. While the

tracking was indeed facilitated by scanning a QR code along the collection route, the weight comparison was not possible because different scales were used by the waste collectors and the digester staff. Furthermore, waste weighing by waste collectors proved to be a cumbersome task that interfered with their workflow and Loowatt is considering removing this step.

The real-time feedback on collections proved valuable in other ways as well. The CSM can now verify collections and pre-empt customer complaints, while the Loowatt office staff, both locally and at UK headquarters, can monitor the fieldwork, thus improving communication between the technical and service teams. Loowatt is now able to track planned and actual collections reported through the mobile app, which enables them to determine where there are failures to be addressed and, more generally, to better understand their operations to improve waste collection.

FEEDBACK ON THE MOBILE APP AND WEB DASHBOARD FROM LOOWATT STAFF:

"We [CSM and Pit emptier] used to do our reporting every Monday."

"Every time the pit emptier has done his job in one household, the picture turns green in the application. The people from the office can then see in the web platform that he has done his job."

"I know exactly that the barrel went from the pit emptier, to this customer. I know as well that this customer still has some full barrels. [The pit emptier] will scan the QR code and bring them back to the site, then I will enter them in the system. I know specifically what load of work we have done today."



Photo credit: Loowatt. Pictured Tojoniaina Andriambololona.

The benefits linked to data visibility, transparency, communication and coordination have convinced

Loowatt that these tools are crucial to improving their efficiency and scaling their operations

"The web and mobile-based platform is an important tool in our goal of providing sanitation services to low-income urban communities. The most immediate benefit has been data visibility and transparency easily available to our Madagascar field staff, management team and London HQ. The data has been the foundation of conversations and initiatives on driving operational efficiency, particularly in regards to servicing efficiency and repayment rates. Instead of debating the metrics, the team can focus on making changes and seeing the results in real time.

In addition, one of the benefits of the mobile app has been to collect more granular customer data, which has enabled us to calculate the Poverty Probability Index (PPI):⁴ something we would not have measured were it not for the grant. As a widely accepted metric on measuring poverty levels, the PPI allows us to measure and track the socio-economic status of our client base and demonstrate the impact of our service. The PPI data allows us to pinpoint what segment of the population we are serving and see how that segment changes as we introduce new solutions."

VIRGINIA GARDINER, LOOWATT CEO

Loowatt is planning to make the following improvements to support their growth:

- Integration of Airtel Money transactions in Loowatt's accounting system and dashboard;
- Integration with another mobile money provider to give customers a choice;
- Specific customized views of the dashboard for CSM and waste collectors; and
- Improvement of the mobile app in cases of poor mobile connectivity so that it can still work offline.



Photo credit: GSMA. Pictured Rodeo Anicet Fiononana (left) and Jérôme Rakotondrasolo (right).

4. <https://www.povertyindex.org>

Recommendations

FOR MOBILE NETWORK OPERATORS



Consider any additional steps to support familiarity with USSD. The complexity of using the USSD menu can be a barrier to using mobile money for utility payments. Mobile operators and their partners should continue their efforts to simplify the user experience and build familiarity with the service.



Continue to develop the mobile money ecosystem and partner with utility service providers Having a thriving ecosystem and a variety of use cases for mobile money drives users to "invest" in registering and using mobile money regularly. Utility service providers like Loowatt not only provide these use cases, but also offer essential education and "handholding" from the beginning of a mobile money journey until customers are confident and regular users.

FOR SERVICE PROVIDERS



Consider the customer value proposition when pushing for mobile money adoption. Educating and providing support for mobile money usage must be accompanied by a clear and compelling value proposition for the end user. In the absence of such a proposition, incentives can be considered to drive adoption and usage.



Think of integration and reporting from the start. Integration of multiple data sources and visual reporting should be part of the core functionalities of a Minimum Viable Product (MVP). Although data visibility and transparency are the crux of mobile tools, organisations are often not prepared for the volume of data produced and the skills required to analyse and use it. Having integration and reporting as part of the basic functionalities, even if there is time and budget pressure to keep the MVP as lean as possible, will help to create useful data from the start.



Re-use and partner on mobile app development where possible. Loowatt has invested considerable time and resources to develop a mobile app and web dashboard and has realised the benefits of these tools. It is therefore considering partnering with other organisations in the Container Based Sanitation Alliance to develop an open source platform that can be leveraged across multiple organisations. With small margins and a lack of funding in the sanitation sector, Loowatt sees value in consolidating its experience and existing technical solutions to support a broader goal of removing waste from communities and safely treating it.

Photo credit: Loowatt.

Appendix

Methodology

Monitoring and evaluation methodology and design was provided by Alexandra Tyers of Tyers Consulting.⁵

All data used in this case study is primary data and sources include:

- A baseline survey conducted by Loowatt from January to March 2016 with 31 customers.
- An endline survey conducted by Loowatt in February 2017, with 25 of the original 31 respondents that were surveyed at the baseline. The six customers who withdrew from the service did so for a number of reasons, including moving homes and completing the construction of a latrine.
- Operational monitoring data from March 2016 to March 2017, using data from the mobile app and the dashboard, as well as data from Airtel Madagascar on mobile money and SMS free hotline usage.

- An independent third-party qualitative evaluation, conducted by ATW,⁶ a research agency based in Madagascar, in February 2017 and consisting of two focus group discussions with Loowatt customers and in-depth interviews with Loowatt personnel: Customer Service Managers, Administrative Assistant in charge of the platform, the Maintenance Technician and a Toilet Servicer.

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 the 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.

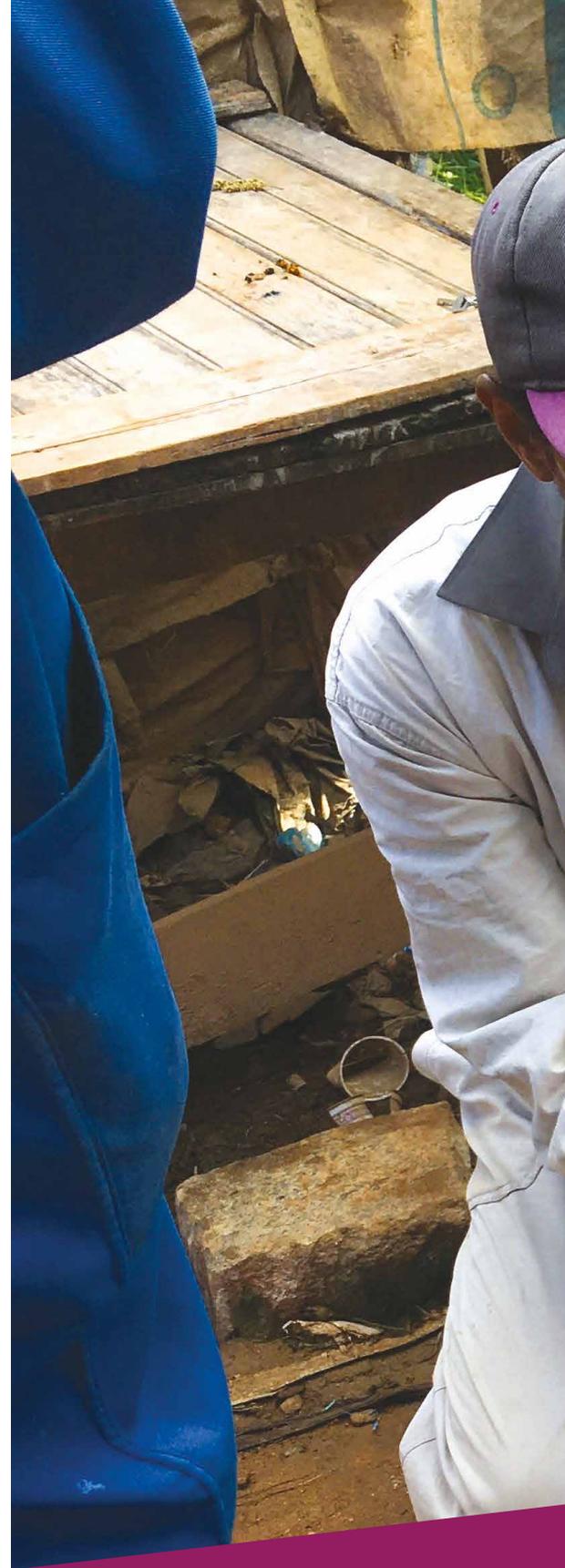
With this, we recognise some limitations of the data: capacity and budget restraints means that most field data relies primarily on self-reported responses by users/beneficiaries; the sample sizes are statistically significant where possible, but statistical analysis has not been applied.

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

6. https://directory.esomar.org/country/08_Madagascar/228_ATW-Consultants.php



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www.gsma.com/mobilefordevelopment/programmes/m4dutilities



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