SANITATION

1. Tackling the sanitation challenge with mobile technology

Providing access to basic sanitation services remains one of the most complex and pressing global development and public health challenges. Worldwide, 2.5 billion people lack access to basic sanitation services[1] (almost half are forced to defecate in the open), while another two billion do not have access to safely managed sanitation services.[2] The unprecedented pace of urbanisation is compounding this challenge. Urban population growth, 90 per cent of which is concentrated in Asia and Sub-Saharan Africa, is dramatically outpacing gains in access to safe sanitation since most new urban residents are forced to live in sprawling informal urban settlements where the lack of sanitation services is especially acute.

Poor sanitation for some is a public health disaster for all

Rich and poor alike — and it has a profound effect on economic development. It is estimated that lack of access to sanitation has a global cost of approximately $260 billion every year, and diseases related to unsafe sanitation are responsible for six per cent of global deaths.[3] This is why sanitation is the focus of this year's M4D Utilities annual report, drawing attention to the need to support innovative sanitation solutions powered by mobile technology.

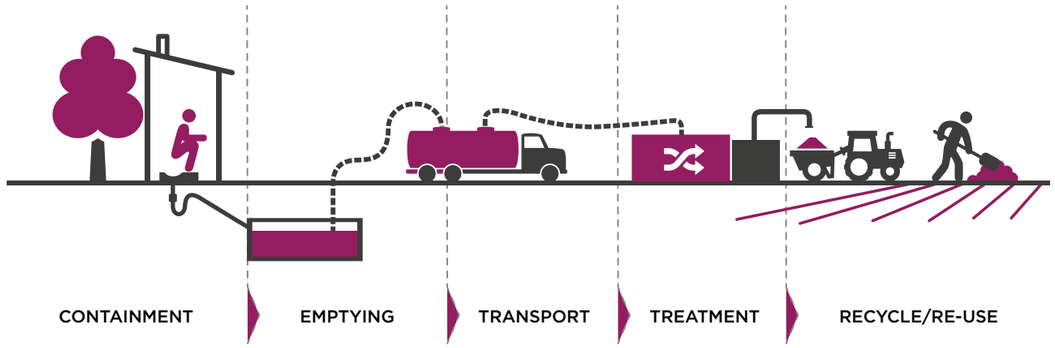
Mobile services (calls, SMS, mobile apps), mobile payments and machine-to-machine (M2M) connectivity can help to link disconnected parts of the sanitation value chain (e.g. containment and treatment), allowing services to be monitored remotely, reducing operational costs and connecting end users with service providers. Here, we outline the three main trends in mobile-enabled sanitation delivery:

Mobile enables the coordination of multi-stakeholder value chains, providing accountability and transparency

Resilient sanitation systems must go far beyond the provision of toilets. To allow different sanitation stakeholders to connect services along the sanitation value chain, various activities, such as pit emptying, waste collection, transport and recycling, must be monitored and coordinated effectively. GIS technology can be applied to geolocate sanitation infrastructure, trucks and routes through GPS-enabled phones. Smart tags/sensors can be used to track the use of facilities, improve fleet management and help provide accountable emptying/waste management services.

Figure 1 Source: Bill & Melinda Gates Foundation

Sanitation Value Chain



The solutions we have been funding as part of the GSMA M4D Utilities Innovation Fund provide evidence that mobile technology is increasingly regarded as a tool for optimising logistics and transport management. For instance, the Kampala Capital City Authority (KCCA), which received a grant from our programme in October 2017, aims to scale a mobile platform and geodatabase that connects pit-emptying entrepreneurs with customers and tracks service delivery across the sanitation value chain. This solution is particularly relevant in densely populated informal settlements where a significant proportion of the population is not connected to a sewerage network (in Kampala, 92 per cent of residents rely on non-sewered or on-site sanitation).[4] It enables KCCA to map the location of communal sanitation facilities, such as school toilets, while tracking and coordinating regular pit-emptying activities by private service providers.

As of November 2018, KCCA has mapped 171,268 sanitation facilities throughout Kampala.[5] Insights from its geodatabase and sanitation customer call centre have provided KCCA with actionable information, such as the characteristics of sanitation facilities, how frequently pits are emptied in different districts and the distances between pits and waste treatment plants. Given that 30 per cent of all pit latrines in Kampala's informal settlements are still emptied into the environment,[6] KCCA aims to use this information to target and guide investment planning, allocate resources and regulate service delivery and standards enforcement.

Practical Action Bangladesh is another GSMA M4D Utilities Innovation Fund grantee that is launching a mobile-based utility services platform for municipalities in partnership with a mobile operator, Robi Axiata Limited. Municipalities will use the platform to receive, track and fulfil requests from residents for water and sanitation-related utility services. Customers will pay contracted entrepreneurs via Robi Cash, Robi Axiata's mobile money solution, speeding up the delivery of services that might otherwise be delayed until payment is received.

Decentralised sanitation ventures are trialling mobile payments

Mobile payments can have several benefits for both sanitation service providers and customers. For service providers, these benefits include less cash handling, more efficient digital payment records and safe and timely transactions. In areas where desludging is carried out by private entrepreneurs, providing support for service providers to receive mobile money payments could open new opportunities for them to access mobile money savings and loan products.

GSMA M4D Utilities Innovation Fund grantees, Practical Action and KCCA, have both begun to trial mobile payments. KCCA is working closely with MTN Uganda to promote mobile money to professionalise pit-emptying businesses. For the end user, mobile payments provide a safe remote transaction method, while mobile wallets can allow them to save for vital sanitary purchases, such as desludging services. Loowatt's use of mobile payments (see case study) has inspired its partner organisation from the Container Based Sanitation Alliance (CBSA)-SOIL to trial mobile payments in Haiti.

2018 research into the role of mobile money in promoting access to sanitation services in Dakar suggests that mobile savings accounts can help incentivise people to regularly purchase desludging services.[7] It concluded that sanitation service providers should explore using mobile money saving technologies to market their services and become more competitive.

Mobile app-enabled platform models help low-margin business models scale

Mobile-enabled platforms can help municipalities identify gaps in public service delivery, while enabling partnerships with private entrepreneurs, donors and NGOs. Platforms can also provide a way to empower, train, formalise and professionalise sanitation entrepreneurs who often carry out activities critical to the effective provision of sanitation services, such as pit emptying, without any technical or material support.

Svadha, a GSMA M4D Utilities Innovation Fund grantee, is a sanitation ecosystem aggregator based in Odisha, India. Svadha aims to build better rural sanitation markets through aggregation of innovative, quality sanitation products and services delivered through a large network of entrepreneurs using information and communication technology (ICT). SaniMark, Svadha's mobile app, allows sanitation entrepreneurs to browse and choose from a range of affordable sanitation products, such as toilet bowls and pipes. Svadha also offers training to sanitation entrepreneurs to help them navigate the smartphone app and deliver value-added after-sales support services to its customers, such as toilet insurance or optional cleaning services.

Both Svadha and Practical Action (mentioned earlier) provide good examples of mobile as an enabler of B2B and B2G platform services. Mobile operators seeking to expand their mobile money ecosystems to less penetrated markets could benefit from driving uptake through these platforms, as pioneered by Robi Axiata and Practical Action's partnership in Bangladesh.

Mobile applications can also unlock revenue streams from circular economy approaches that seek to transform waste into value-added products, such as renewable energy or organic fertilisers. Led by Loowatt, a past recipient of the GSMA M4D Utilities Innovation Fund, new grantee CBSA is developing a mobile app and web-based platform to support its innovative waste-to-energy business model. The waste collected from Loowatt toilets is sent to an anaerobic digester where gases are extracted to generate electricity. Then, any drier, nutrient-rich materials are industrially composted to make fertiliser. Pioneering use cases that transform waste into a valuable investment asset can be critical to attracting private investment in the sanitation sector.

Case study 1

Loowatt: Three insights into the use of mobile payments in the sanitation sector

Loowatt is a start-up that designs and deploys waterless toilets that use a film liner to contain waste and odours. In May 2015, Loowatt received a grant from the GSMA M4D Utilities Innovation Fund to pilot mobile payments in the sanitation sector. It found that shifting from cash to digital decreased its costs by around 20 per cent overall, providing a very strong case to digitise payments in the sanitation sector. The pilot also generated some important insights for future mobile payment applications in the sanitation sector:

1. Mobile operator support is crucial to customer adoption of mobile payments for sanitation services: Airtel Madagascar's support and commitment to driving customer adoption of mobile payments proved critical, especially in the lead-up to mobile payment integration. Airtel Madagascar provided free cash-in and bill payment transactions, while also allowing Loowatt's customer service staff to become Airtel money agents, providing Airtel SIM cards where required and ensuring convenient cash-in services.

2. Mobile money adoption requires a constant push, starting with awareness building and continuing with customer support in the first few months of use: Many of Loowatt's customers were first-time mobile money users who encountered typical challenges, such as opening, validating and resetting an account, and feeling uncertain whether payments were recorded accurately. Loowatt addressed this by increasing customer support and providing discounts or rewards for payments made by mobile money to drive adoption.

3. Mobile payments can help decentralised sanitation ventures scale: The visibility into payment collection that mobile payments provide not only allows companies such as Loowatt to reduce their operating costs, but also provides interesting insights from transaction data (e.g. payment activity by gender). Most importantly, mobile payments allow decentralised sanitation ventures to reduce direct customer interaction, a key enabler of scaling social business ventures. As Loowatt expands, it aims to integrate Airtel Money transactions in its accounting system and dashboard, and partner with another mobile money provider to give customers more choice.

The use of mobile technology to improve sanitation services is still in a nascent stage, due to the lack of commercially viable alternative models for the underserved. We expect that our four newest Innovation Fund grants will reveal new business models in the sector, and generate insights into the use of mobile technology to optimise sanitation value chains and digitise payments for sanitation services.

SANITATION

LOOWATT

MOBILE-ENABLED LOGISTICS FOR WATERLESS TOILETS

LOCATION
Madagascar

MOBILE OPERATOR PARTNER
Airtel

USE OF MOBILE CHANNELS
Mobile App / Mobile Money

FIND OUT MORE
Loowatt: Digitising the container-based sanitation value chain in Madagascar

PROBLEM: Access to basic sanitation services is a major development and public health challenge in Madagascar where only 10 per cent of the population uses basic sanitation services.[8] Providing basic sanitation is particularly challenging in Madagascar's capital, Antananarivo, where high urban density poses significant challenges to waste and faecal sludge management.

SOLUTION: Loowatt has designed and deployed waterless toilets (for both public and household use) that use a film liner to contain waste and odours.

GRANT SUMMARY: In May 2015, Loowatt received a grant from the GSMA M4D Utilities Innovation Fund to develop a mobile app to track its waste collection processes, collect payments with mobile money and communicate better with its customers. In May 2018, Loowatt received a second grant from the Innovation Fund as part of the Container Based Sanitation Alliance (CBSA) to help expand and improve its mobile app and web-based platform to support the efficient delivery of household sanitation services.

IMPACT: The mobile app enabled Loowatt to support the service and maintenance of 100 waterless household toilets. The toilets benefitted female customers in particular, who account for 70 per cent of Loowatt's customer base. Collecting payments through mobile money instead of cash provided greater visibility into customer payment records and reduced operating costs by 15 to 25 per cent. As of August 2018, Loowatt's toilets have been used by over 100,000 customers and 200 tonnes of faecal sludge have been delivered to closed-loop treatment.[9]

LOOKING AHEAD: In November 2018, Loowatt announced a partnership with Laguna Water, a joint venture of Manila Water and the Laguna Provincial Government in the Philippines, to roll out the Laguna Portable Toilet Solution (PTS), a first-of-its-kind utility business model for providing non-sewered household toilets. Following a successful pilot, Loowatt will support scale-up of the Laguna PTS starting in 2019.

> 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.
>
> FEEDBACK ON MOBILE APP BY TOJONIAINA ANDRIAMBOLOLONA, LOOWATT STAFF, MADAGASCAR

SANITATION

SANERGY

TESTING MOBILE SENSORS FOR MORE EFFICIENT WASTE COLLECTION

LOCATION
Kenya

USE OF MOBILE CHANNELS
M2M

FIND OUT MORE
Exploring the use of mobile-enabled sensors to optimise sanitation waste collection in Kenya

PROBLEM: Only 30 per cent of Kenya's population has access to basic sanitation services. Most Kenyan households are not connected to the sewerage system and require pit-emptying services. Sanitation services are particularly challenging in densely populated informal settlements like Kibera in Nairobi where the majority do not have household toilets and rely on public pay-per-use toilets.

SOLUTION: Sanergy designs, manufactures and sells low-cost, high-quality sanitation facilities called Fresh Life Toilets in Nairobi, Kenya. FLTs are owned and operated by Fresh Life Operators, residents of informal settlements who run them as a business or value-added service. As part of its franchise agreement, Sanergy provides training, ongoing marketing, business and maintenance support, and collection, transport and treatment services, thereby empowering Fresh Life Operators to provide clean and safe toilets to the residents of informal settlements.

GRANT SUMMARY: In May 2015, Sanergy received a grant from the GSMA M4D Utilities Innovation Fund to test how mobile-enabled sensors (provided by SweetSense Inc.) could optimise the waste collection process. These sensors would provide information on exactly when a toilet was full and needed to be serviced.

IMPACT: Sanergy tested different methods of using sensors to measure different indicators of toilet filling, ultimately settling on one that measured the number of users. However, Sanergy found that this data was not valuable for predicting emptying schedules given the cost of the sensors (including maintenance) and variables like day of the week, historical fill rates and location of the toilet. Sanergy found that the sensors could be useful for future planning in new areas, but not for regular route planning.

LOOKING AHEAD: As of May 2018, Sanergy has 1,800 Fresh Life Toilets in operation serving 60,000 people a day in 11 informal housing communities in Kenya. Sanergy's expansion throughout Nairobi has created 220 direct jobs (and a total of 1,250 direct and indirect jobs), while toilets were franchised to over 1,000 operators. By 2020, Sanergy aims to provide sanitation to 300,000 users and expand its operations to Zambia and Ghana.

> I prefer the sensor method [because] it saves time, cost and it is easier to monitor the toilet.
>
> FRESH LIFE OPERATOR, KENYA

SANITATION

SVADHA

A MOBILE PLATFORM TO CONNECT SANITATION MICROENTREPRENEURS WITH PRODUCT MANUFACTURERS

LOCATION
India

USE OF MOBILE CHANNELS
Mobile App

FIND OUT MORE
Svadha: Developing a digitally enabled sanitation ecosystem in Odisha, India

PROBLEM: In October 2014, the Prime Minister of India launched an ambitious national sanitation programme that aims to eliminate open defecation by 2019. The Swachh Bharat Mission (SBM) has received unprecedented political support and mobilised $25 billion from government, the private sector and civil society.[10] However, pit emptiers and sanitation entrepreneurs, who are critical to achieving the SBM's goals, often lack technical and material support.

SOLUTION: Svadha is a social enterprise in Odisha, a state in India, that builds better rural sanitation markets through aggregation of quality sanitation products and services. It has developed a mobile app to optimise the fragmented value chain between product manufacturers and microentrepreneurs who sell and install toilet products.

GRANT SUMMARY: In October 2017, Svadha received a grant from the GSMA M4D Utilities Innovation Fund to develop and launch SaniMark, a platform that integrates and enhances the sanitation ecosystem through e-commerce and provides customised, data-driven business support for entrepreneurs.

IMPACT: As of November 2018, 315 microentrepreneurs in the sanitation sector have signed up to Svadha's mobile app, 60 per cent of which are classified as active users.

LOOKING AHEAD: With a solid customer base in place, Svadha is now focusing on increasing app usage rather than downloads, as the true value of the solution will only be realised through increased business and transactions on the app. Svadha also recognised that a B2B app would not be complete without a link to the wider sanitation ecosystem, so is developing a customer-facing app that will allow customers to identify sanitation entrepreneurs in their area, while also providing access to masons and plumbers for installation and after-sales support. By 2020, Svadha aims to expand into other Indian states and explore partnerships in international markets to create a global virtual sanitation platform.

> Svadha helped me learn all of the technical aspects of sanitation and, with the help of credit, I started my own business — due to which I am completely financially strong now. Good quality material from Svadha also increased my demand and credibility among the community members.
>
> MR. GIRI,
> SVADHA ENTREPRENEUR, INDIA

SANITATION

KCCA

USING MOBILE TECHNOLOGY TO IMPROVE SANITATION SERVICE DELIVERY IN KAMPALA

LOCATION
Uganda

USE OF MOBILE CHANNELS
Mobile Services / Mobile Payment

PROBLEM

In Kampala, Uganda's capital, over 60% of the population lives in informal housing, while only 10% to 15% of the city is connected to formal sewerage.[11] In this context, pit latrines and septic tanks are often emptied haphazardly by independent pit emptiers who may dump waste illegally into the environment.

SOLUTION / PROJECT

Kampala Capital City Authority (KCCA) recently unveiled a sanitation strategy with a Geographic Information System (GIS) tracking system that allows customers to request services through a call centre that sources the jobs to independent pit emptiers. The pit emptiers use an app to record collection, transport and dumping at the treatment plants. In November 2017, KCCA received a grant from the GSMA M4D Utilities Innovation Fund to upgrade the pilot GIS tracking system, build capacity and promote pit emptying businesses. They are also working with MTN to promote mobile money as a tool for the pit emptiers to collect payments.

LOOKING AHEAD

As of November 2018, 45 pit emptiers have connected to KCCA's mobile app. 20 pit emptiers are also using MTN's mobile money service. 85% of pit emptier clients expressed a willingness to pay via mobile money.

CONTAINER BASED SANITATION ALLIANCE (CBSA)

USING MOBILE TO STREAMLINE THE DELIVERY OF HOUSEHOLD SANITATION SERVICES IN MULTIPLE COUNTRIES

LOCATION
Madagascar, Haiti, Kenya, Peru

USE OF MOBILE CHANNELS
Mobile Services

PROBLEM

A rising global population and rapidly growing urban areas are making it even more challenging to meet Sustainable Development Goal 6: Ensure availability and sustainable management of water and sanitation services for all.

SOLUTION / PROJECT

Since 2010, container-based sanitation (CBS) solutions have been emerging as a viable low-cost option for sanitation service delivery, particularly in low-income urban settlements where demand for sanitation services is high and on-site sanitation and sewerage are not feasible or cost effective. Founded in 2016, the **Container Based Sanitation Alliance (CBSA)** is a coalition that seeks to help CBS services reach scale and have a sustainable impact in urban areas around the world.

In May 2018, the CBSA received a grant from the GSMA M4D Utilities Innovation Fund to develop a mobile app and web-based platform to support the efficient delivery of household sanitation services in multiple countries.

LOOKING AHEAD

In November 2018, Loowatt, a CBSA member, announced a partnership with Laguna Water, a joint venture of Manila Water and the Laguna Provincial Government in the Philippines, to roll out the Laguna Portable Toilet Solution.

PRACTICAL ACTION

UTILITY SERVICES PLATFORM TO REQUEST MUNICIPAL SERVICES AND PAY USING MOBILE PHONES

LOCATION
Bangladesh

USE OF MOBILE CHANNELS
Mobile Services / Mobile Payment

PROBLEM

50%[12] of Bangladesh's population still does not have access to basic sanitation services. 80%[13] of Dhaka's rapidly growing population, around 12 million people, lack access to sewered toilets and must use on-site sanitation instead.

SOLUTION / PROJECT

Practical Action is a UK-based development NGO with operations in Latin America, East Africa, Southern Africa and South Asia. In these regions, Practical Action works with poor communities to develop appropriate technologies for renewable energy, food production, agro-processing, water, sanitation, small enterprise development, building and shelter, climate change adaptation and disaster risk reduction.

In October 2017, Practical Action received a grant from the GSMA M4D Utilities Innovation Fund to launch 1Service, a water and sanitation services platform through which customers can request and pay for services and give feedback.

LOOKING AHEAD

Once the 1Service platform successfully connects users to utility services, Practical Action aims to use the platform to help municipalities collect housing taxes. Depending on the success of 1Service in the three municipalities where the platform is being trialled, Practical Action may replicate the model in another 300 municipalities.