

Quenching a Thirst: Digital Finance and Sustainable Water Service for All

Life without water is not an option. Its ongoing availability is critical for any economic opportunity to become reality. One of the United Nations' Sustainable Development Goals is to "ensure availability and sustainable management of water and sanitation for all." The word "sustainable" has many implications related to the management of water resources, and also to the universal delivery of services to all people. Digital financial services (DFS) are important tools that help make water provision financially and operationally sustainable by linking innovative technology with improved ways of delivering the service.

Water and Digital Financial Services

Throughout the world, 663 million people lack access to a secure source of water, and more than 3 billion do not have piped water on their premises (UNICEF and WHO 2015). Even those with access to "safe" water can be endangered: 1.8 billion people drank water contaminated with fecal matter as recently as 2012 (UNICEF and WHO 2015). And 842,000 deaths—one-third of them children—could be prevented annually by using improved sources of water (WHO 2015).

DFS, including payments, savings, credit, and insurance, can be accessed remotely and securely via an agent with a point-of-service (POS) device or using mobile money accessed on a mobile phone. Over 556 million people have registered for mobile money accounts globally. A third of these accounts are used regularly.¹ To date, DFS have allowed users to transfer funds, access loans, save/store money, and pay bills. Looking forward, DFS can be used to create more effective ways to connect new customers and to deliver essential services (electricity, water, education) in a sustainable way. The clearest example is pay-as-you-go solar, an industry that has leveraged digital payments to provide 800,000 users with electricity in the past five years (GSMA 2017b).

Business Plans That Reflect Reality

Water is a right, but it is not free. For providers, implementing charges for water consumption (tariffs) on those users who can pay reflects the true cost of a scarce resource, and is necessary to ensure continued provision. Even higher charges are needed if the provider is expected to make a profit and offer a return to investors. But consumer and political

pressures often keep tariffs from being set at levels that reflect the full life-cycle costs of providing water.

If a water service organization is unable to cover its costs on a per-household basis, then achieving universal access means adding thousands or millions of loss-making connections. Economist Sanford Berg (2013) wrote: "Keeping [water] tariffs low is one popular objective, but it is totally inconsistent with expanding service coverage to the poor (unless a donor or government provides funds consistently over time). Thus, there is a clear need for a business plan that reflects reality." This is where digital finance can play an important role.

DFS are unlikely to facilitate large capital expenditures: pipes, treatment facilities, pumps, etc. The advantages of digital are likely to be seen at the "last mile" for both providers and consumers, where DFS can lower the cost of lending or saving to finance connections (expanded access), as well as making frequent bill payments more efficient and affordable (sustainable provision). This Brief examines specific barriers to access and sustainability in the water sector, and discusses channels through which DFS can help providers overcome those barriers.

Water Service Delivery Models: Urban, Peri-Urban, and Rural

Water delivery models in lower-income countries can vary greatly among urban, peri-urban, and rural communities.

Urban dwellers usually access water on premises or at a nearby standpipe. The water is delivered by a municipal utility or the local branch of a national water utility. Users make monthly payments to the utility at crowded payment halls, bank branches,

¹ Registered users and 90-day active as of December 2016 (GSMA 2017a).

Box 1. Safe Water Network

Rural water systems have been built in Africa for generations. Yet, due to a lack of attention to financial management, they rarely last. Safe Water Network is building sustainable service delivery systems by establishing micro-utilities throughout rural and peri-urban Ghana—centralized pumping and distribution—but on a village scale.

Over 90 percent of its 60 stations collect sufficient revenue to cover local operational expenses within their first year. A shift to digital collections will create cost savings and enable more profitable in-home connections. The healthier the stations are financially, the stronger their operations, creating a lasting solution for years to come.

Note: For more information, go to <http://www.safewaternetwork.org>.

Box 2. Dar es Salaam

As Dar es Salaam's population has grown, water service has declined: only 27 percent of residents had reliable water in 1997, compared to 100 percent in 1961 (WaterAid 2008).

In 2009 the Dar es Salaam Water Supply Company (DAWASCO) began accepting digital payments from mobile wallets and third-party agents. Customers using these methods paid more frequently and reported that payments were aligned more closely with incomes (Krolikowski, Fu, and Hope 2013). Use of mobile payments was also found to reduce petty corruption (Krolikowski 2014), and DAWASCO's CEO attributed a 38 percent increase in monthly revenue partly due to the acceptance of digital payments (Omary 2013).

or at designated agents. Providing water to large, dense populations enables economies of scale, but connecting pipes to individual households remains expensive, and maintaining high-quality service is a challenge. Leaks and nonpayment create large financial losses. In 2014 the median utility was barely covering its operating costs and had "no capacity to replace its assets once they wear out, let alone expand services to larger groups of consumers" (World Bank and Water Sanitation Programme 2014).

Peri-urban and informal urban water service is made up of a mix of delivery channels. Some users in these areas are served by the municipal utility, or would be if they could afford individual connections. Others use communal water systems, which are managed by local governments. Among these, some may have piped connections to their homes, but the proportion using community standpipes is larger compared to use in urban areas. Many are served by unofficial water operators, who own and operate pumps, boreholes, water kiosks, or even tanker trucks. Settlements in informal and peri-urban areas are typically unplanned, possess ambiguous legal status, and receive service that reflects those realities. Crucially, water for these customers is often more expensive on a per unit basis—the "poverty penalty" at work (Mendoza 2011).

Rural water is a formidable challenge. For isolated households, wells must be installed at home. In rural areas with sufficiently large populations, water systems do exist. They are typically built with public or donor funds. Ownership and management of those systems is usually transferred to community water organizations, but these organizations often lack the financial and technical expertise to operate, maintain,

bill for, and replace complex water systems in the long term (see Box 1) (Moriarty et al. 2013). A 2009 survey found that 36 percent of rural water points in 20 sub-Saharan countries were not functioning, primarily because of a lack of funds for maintenance (Rural Water Supply Network 2009).

Across urban, peri-urban, and rural areas, charging cost-reflective tariffs is politically fraught and economically challenging. Providers must contend with extreme price sensitivity thanks to competition from free, albeit contaminated, surface water. And service lapses can quickly lower willingness to pay, thus creating vicious cycles that too often end in insolvency.

Use Cases in the Water Sector

There are at least four DFS use cases that have the potential to catalyze new water service delivery models.

Water bill payments. Digital finance enables flexible, mobile payments. For users, this reduces the time and cost of making payments at bank branches or service centers. Utility clients in Kiamumbi, Kenya, reduced the time required to pay a bill by 82 percent when they switched to mobile payments (Hope et al. 2011). For water services providers, digital payments enable cost savings on cash collection, simplify supplier/vendor payments, and bring much-needed transparency (see Box 2).

This last point is often underrated, but as the sector attempts to increase annual expenditures threefold over the next 15 years, it will need to rely on financial instruments that are secured by project cash flows, such as water bonds. For instruments like these, digital payments offer cash-flow transparency and a

Box 3. Sarvajal

In India, rural women spend 700 hours each year collecting water that is often contaminated. Piramal Sarvajal is a mission-driven social business that serves over 300,000 people with franchised water ATMs: automated water dispensing units where people can pay per use. Customers purchase prepaid cards, then top them up by paying agents in cash or via mobile payments. With over 180 water ATMs in 12 Indian states, Sarvajal is using digital finance tools to sustainably serve poor communities with safe, convenient water.

Note: For more information, go to <http://www.sarvajal.com>.

secure pass-through, something that investors have expressly demanded in the energy access sector (Waldron forthcoming).

Pay-as-you-drink. In 2015, developing country utilities pumped 16 billion cubic meters of water that were never billed, enough for 180 million people's annual use (Kingdom, Soppe, and Sy 2016). Prepaid service, where users pay for discrete amounts of water *before* accessing it, can combine with mobile payments to create a pro-poor service model that reduces waste, offers flexibility, and prevents unnecessary markup from middlemen. Whether on public water points (such as water automated teller machines [ATMS], see Box 3) or inside households, prepaid meters allow lower-income users to match expenditures to incomes and avoid lumpy bills. Mobile payments allow prepaid service to be implemented without building out an entire infrastructure of cash-in points. Prepaid service also allows providers to better identify leaks, stop pursuing arrears, and achieve a better cash flow position. With this model, providers are more able to serve low-income users profitably and, therefore, to expand access.

Digital credit to offset connection costs. Water connections and prepaid meters are expensive, often costing the equivalent of some poor households' monthly budgets. By removing the chief barrier to water connections—their high upfront cost—microcredit allows poor households to pay for these connections over time (see Box 4).

Digital channels can lower the costs of underwriting, disbursing, and collecting loans, as well as facilitating savings, to finance connections. In addition, digital payments can be integrated into some asset lending to create a pay-as-you-go experience, wherein the customer's loan installments are tied directly to use.

Box 4. Water Credit

Water Credit is a program of Water.org that aims to catalyze lending to the water, sanitation, and hygiene sector from microfinance institutions (MFIs) by providing technical assistance to MFIs and both financial and technical support to nongovernment organizations that work with water services providers. In India alone, Water Credit has resulted in over 500,000 water and sanitation loans being disbursed by 15 MFIs. The average loan size is small (\$138), and two-thirds of borrowers earn <\$1.90 a day, but repayment rates are 99 percent (Foster 2016).

Box 5. eThekwini Water and Sanitation

The South African constitution has guaranteed a right to water since 1997, but implementing this has been difficult. eThekwini Water and Sanitation (2015) serves the third largest municipality in South Africa, and has provided free basic water to households since 2000, although recent droughts have forced it to limit this service to lower-valued properties. While extending water access and reducing water-borne diseases, the utility was also able to lower nonrevenue water and maintain financial sustainability. Other providers can learn from eThekwini's success, and leverage DFS to subsidize consumption by low-income households.

In the water sector, this holds potential for prepaid meters (where the cost of the meter can be added to credit top-ups).

Digital government transfers. Too many people still cannot afford to pay for water. Switching to a prepaid service requires a suitable mechanism to ensure households receive a baseline amount of water (see Box 5). Targeting subsidies to reach the poorest people is difficult and expensive, particularly when the subsidy is relatively small. But digital finance platforms could allow governments and international organizations to subsidize a minimum level of water consumption by crediting a user's water balance.

Digital Finance and Sustainable Service

Digital finance enables water and sanitation service delivery models that have lower upfront costs and more flexible repayment, both requirements of poor households. By reducing operational expenses and improving collections, serving poor households sustainably becomes possible. For service providers seeking to expand access while recovering costs,

Box 6. Maji ni Maisha

In Kenya, community water service providers were unable to renovate and expand piped water systems without access to finance, but skepticism over the sector's viability resulted in high interest rates that were unaffordable.

K-Rep, a Kenyan MFI, was able to secure a 50 percent portfolio guaranty from USAID and began lending to communities, who received output-based grants of up to 40 percent of project costs from the World Bank once targets were met. The Maji ni Maisha program brought improved service to 190,000 people. And within informal communities, K-Rep also provided connection loans, which allowed users to pay their indoor piping over 2–3 years, bundled together with their bill and paid (thanks to the Kenyan firm WonderKid) via M-Pesa (World Bank 2016).

these interventions are crucial for reaching low-income customers (see Box 6). The addition of digitally directed subsidies can further grow that pool of viable customers.

Digital finance will not solve all the sector's problems: tariffs must still be set to reflect costs, subsidies must be progressively introduced and targeted, and leaky pipes must be plugged. But using digital finance to improve the ways that poor households finance, afford, and pay for water can help service providers to claw their way, first toward sustainability, then to cost-recovery.

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