7th RWSN Forum "Water for Everyone"
7ème Forum RWSN « L'eau pour tous »

29 Nov - 02 Dec 2016, Abidjan, Côte d'Ivoire

PEER REVIEWED

Providing handpump spare parts within 24 hours through the private sector

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Abstract
This paper tells of a company in Ghana building a business providing rural communities with better access to handpump spare parts. A mobile phone platform was developed to reach rural customers and fill the need for better distribution without the need to build costly physical locations. This mobile phone technology serves as an entry point into an untapped customer base and a gateway into other business ventures. The company is positioning itself as the only supplier to rural communities of several water, sanitation and hygiene items.

Introduction

> Edward D. Breslin, CEO, Water for People, says it best, "…*the images that dominate [the media] - pictures of children happily gulping water from a new tap- do not tell the whole story. The real image should be the one that plays itself out every day all over the world….of the woman walking slowly past a broken handpump, bucket at her side or on her head, on her way to (or from) that scoop or dirty puddle that she once hoped will never again be part of her life.*"(Breslin, 2010).

Break downs in rural water service are frequent in most developing countries. Harvey (2011) estimates that at any one time in sub-Saharan Africa 36% of handpumps are out of service. Studies show that the handpump crisis is imminent with an actual life time of a donor-sponsored standard handpump being 3 - 5 years. A recent study of three districts conducted by Ghana's Community Water and Sanitation Agency and IRC found 34% of the 474 water points are non-functioning for more than 18 days a year – not meeting the benchmark of providing basic service (Wells, 2015). This functionality of handpumps depends on the ready availability of spare parts and the services of an Area Mechanic. Unfortunately, spare parts are not readily available everywhere and getting the services of an assigned Area Mechanic can be a daunting task. Also, where the spare parts are available, the cost of getting them are often high. As a result, handpumps are regularly out of order and it may take weeks or months before repairs are undertaken. For example, one community in the Shai Osudoku district (in Greater Accra Region) reported a handpump breakdown. No Area Mechanic was available locally and one had to be brought in from ~300km away (Bosomtwi in the Ashanti Region). The time spent on travel alone was six hours. These challenges often lead communities to resort to unsafe sources of drinking water. The situation is far more serious when rural household have to walk several miles to get water from unimproved sources such as rivers and ponds.

Unfortunately the business sector has not yet managed to fulfil the gaps in water services. The typical cost involved in the sale of spare parts alone is high and has stopped most businesses from getting involved. Setting up distribution points close enough to reach all the rural communities that need such service is an expensive undertaking for the private sector. Small profit margins and infrequent purchases from within a distance a customer is willing to travel make it non-profitable to build physical stores. Take for example

the most frequently bought spare parts. They are plastic bush bearings, pipe rods, and cylinders for handpumps. These spare parts cost GHS 8, GHS 42, and GHS 320 (~€2, €9, €70) respectively. The profit margin of the highest part is not more than GHS 48 (€11) with approximately GHS 20 (€4.4) of this needed for transportation of the part. This low profit discourages the private sector from going into such business ventures.

Due to the mirage of issues mentioned above, a platform for purchasing spare parts was developed. This technology allows for scaling up the spare parts distribution chain nationally at a very low cost as compared to the existing business model of setting up stores at locations close to customers. Earning commissions from the sale of spare parts alone is not a lucrative enough venture for most businesses to undertake the upstart cost. The equation changes, however, if donor support is leveraged and the developed platform is able to sell other products.

Approach

Following an analysis of the handpump spare parts market, it was concluded that a reliable supply chain coupled with the use of mobile phone technology, would be the best way to provide rural communities easy access to spare parts. The use of mobile phone technology greatly lowers the cost for both users and service providers. Mobile phones erase the need for community members to travel long distances for hours, at a high cost in order to check prices, check availability, order a part, or find a mechanic. Mobile phone technology also allows for rapid scale up since a physical presence is not necessary to conduct business. With these principles in mind, SkyFox, a Ghanaian social enterprise, developed a mobile phone application and e-commerce platform which enables customers to get spare parts delivered to them within 24 hours.

When the technology is deployed in communities, training is given as well as an accompanying user manual. The technology runs on every telecommunication network in Ghana and does not require internet, phone credit, or a smartphone to work. If a user dials *714*55# (or *417# on Tigo) on a phone in Ghana, a menu pops up. Once the menu comes up, the user simply presses the number corresponding to the menu prompts. The system enables communities to report on the functionality of their boreholes, check the cost of handpump spare parts, and order spare parts. If a pump is reported as not working, the system alerts an area mechanic to assess the situation and fix the pump. Handpump functionality data is shared with the government body responsible for Ghana's rural water supply (Community Water and Sanitation Agency) and other stakeholders. If a user wants to order an item, a code for the item is needed. This code comes from the provided ordering manual. Orders for spare parts are paid for in full via mobile money (commonly available in Ghana) before items are dispatched. A combination of existing delivery businesses are used to send the ordered items. By knowing which destinations various delivery companies serve and ensuring drivers know which route our items need to take when there are multiple route options to their final destination, the company is able to ensure orders arrive anywhere in the country within 24 hours.

These technology-based services benefit several groups involved in the water pump repair. Communities benefit from the service because it allows them to check the fair prices of spare parts, avoid any travel or phone calls to contact an area mechanic, and have their pump repaired quickly. Area Mechanics benefit from the service because it gives them a 5% commission on parts they purchase, and items are delivered close to them. Both of those groups benefit because the prices are lower than what is typically available locally. SkyFox benefits by getting a commission on its purchases. The spare parts supplier benefits because their customer base is expanded to farther areas. The Government of Ghana and the water sector benefit because the functionality data collected is fed into the national water monitoring database (District Monitoring and Evaluation System) in order help make more informed decisions and policies.

With this technology platform, the company realized several further business opportunities. In its basic form, the system allows for users to input data and make requests digitally. With these elements, the

technology can collect any sort of multiple choice data, take requests for any item or service, or provide brief information. The reliance upon a technology allows for rapid scale up and the coverage of geographic areas as large as distribution channels reach. The company realized that the income from spare part orders alone is not enough to sustain the business in its entirety. Thus expanding into further services is necessary.

The same technology which was aimed specifically at borehole upkeep will be used with for new products being sold. The back-end system for tracking orders of spare parts will soon also track orders for books, hygiene products, and construction materials. The company plans to add further products based upon community feedback and needs. The same payment mechanisms and distribution channels will be used. Lessons learned from sales of the initial item, spare parts, will greatly guide ventures into other items.

The ongoing cost for the technology to function, including servers and telecommunication companies, is approximately 1,300 Euro. The programming was developed with two IT staff members at a cost of approximately 80,000 Euro. The ongoing staffing needs are one accountant, two logistics and support staffers, and one IT programmer each with approximately 20 percent of their time dedicated to the spare parts operation.

Origins and Initial Errors

In order to develop the technology needed, the company entered into a public private partnership (SMARTerWASH) with the Dutch government through a joint project with the think-and-do tank IRC and Community Water and Sanitation Agency. Within this partnership, SkyFox was able to finalize development of the system which. Initial stages of development were supported by the Canadian Grand Challenge Fund (won by the college KNUST) and the Triple S project.

Initially the system was based upon SMS technology. This technology gathered input and requests via text messages. This turned out to be problematic due to literacy issues. Thus the system was changed to one that uses USSD technology. This means rather than sending a text messaged, users see an interactive menu on their screen and only need to select what number corresponds to their desired action.

At the start of the program, the caretakers of the hand pumps were viewed as the target customer. These Water and Sanitation Management Teams (WSMTs) were trained but their orders for spare parts were very few. In the year 2015, the total orders were under 15. The focus on WSMTs was natural as they are seen as the ultimate caretakers of their community borehole(s). WSMTs also are the ones responsible for payment and reporting on the functionality of the borehole(s). Some area mechanics were driving up the cost of repairs by telling the community members that the price was higher than it was. Thus, the company also views the technology as a means to ensure area mechanics are honest on the prices. In time, the company realized that bypassing area mechanics for spare part purchases was fighting against the natural market and also giving a somewhat technical task to the WSMTs. Many of the WSMTs are also illiterate, thus ordering using a system was challenging. Therefore, the target customer was shifted to the Area Mechanics and sales numbers grew to what we see today. The focus on a smaller group of customer (approximately 30 per region) allows the company to call and follow up with each Area Mechanic.

Challenges

- Of two main spare part suppliers, one has not partnered with SkyFox. Thus there is heavy reliance upon the dependability of the one partnered supplier. In some cases the part was not available from the partner and had to be purchased at a higher cost from the other supplier. This supplier has not partnered with SkyFox because he believes SkyFox will be a rival in the future.
- Not everyone is able to remember the ordering process.

- Area Mechanics continue to rely upon phone calls to complete orders. Out of the 20 fully successful orders between May 2016 and July, only three were done through the system.
- Communities do not implement pay-as- you-fetch or a monthly tariff, making it difficult to mobilize funds for repairs.
- Some Area Mechanics were not able to follow along with the training program due to inability to operate their mobile phones or because the mobile phones they brought to the trainings were without functional key parts though a secondary phone was owned.

Results and Lessons

- The platform has linked up 1,955 communities and 5,059 facilities with the elements needed to monitor or repair a handpump.
- 117 unique phone numbers used the system to report functionality, check a price, or make an order in July 2016.
- Broken handpumps which would have been repaired within a month are now being repaired in an average of 48 hours.
- Initially, Water and Sanitation Management Teams (which are community-based voluntary groups responsible for the management of water facilities) were targeted as the ones to order spare parts. This did not yield the desired results as only GHS 10,000 (~€2,200) sales came from that in 2015. The target customer was switched to Area Mechanics. This change happened recently but it is proving to be a better approach as approximately GHS 135,000 (~€30,000) has been purchased between March and August 2016.
- The system allows for conflict resolution between Area Mechanics and community members because of its transparent nature. Prior to the implementation of the platform, communities thought Area Mechanics were exploiting them because they do not have access to the suppliers or distributers to confirm the prices. With the SMS system, communities as well as Area Mechanics can check and confirm prices.
- Providing training alone for Area Mechanics does not give positive results. Most Area Mechanics after been trained can remember the processes only within a month. Follow-up trainings and phone calls are needed.
- The interest among communities and Area Mechanics to use the platform is overwhelming. Area Mechanics were surprised with what they are able to do with a simple mobile phone. This made them active and participating during conducted trainings.
- Area Mechanics should be considered as major stakeholders in the water sector and treated as such. This is partially because they can deliberately delay communities from getting potable water in the quest to fulfilling their self-interest.

Conclusions and Recommendations

There is great need to extend business services to rural communities. The service delivery approach used in urban areas typically relies upon physical locations which is cost prohibitive in less densely populated areas. Use of mobile phone technology in combination with a reliable transportation routes allows for rapid delivery to even the most remote of places. The SMS platform has brought smiles to communities and Area Mechanics who until now have travelled long distances to check the price of parts and to make purchases. It has helped reducing time and cost of transport. This has help reduce the downtime of broken facilities. The SkyFox platform is now able to provide orders of numerous products which rural communities have not had easy access to before. The platform, if deployed similarly across other developing countries may drastically reduce down time of handpumps and extend business services to underserved rural communities.

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