Mobile for Development Impact

Research

M4D Service Case Studies

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Mobile for Development Impact

Case study: Nextdrop

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Mobile Utilities

Product summary

Year Launched: 2009
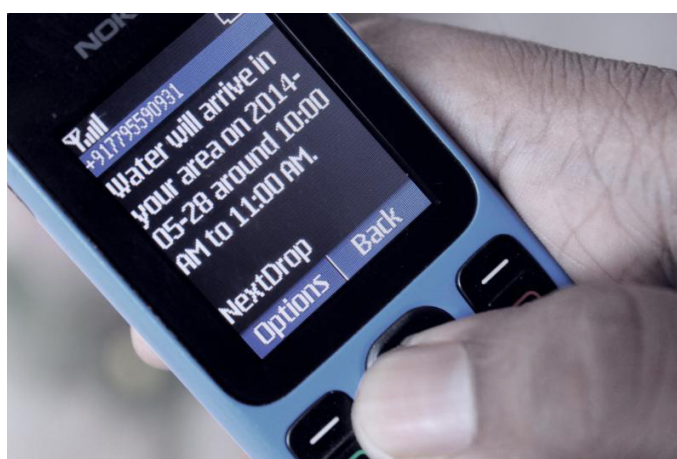**Targeted Device:** Basic phone
Business Model: B2C & B2B, donor (early stage)
Primary Delivery Technology: SMS, Interactive Voice Response (IVR)
Products & Services: Push content, interactive content, data collection
Markets Deployed in: India
Estimated total number of Users: 35,000 Households

NextDrop leverages the recent proliferation of mobile phones in India to provide households with accurate and timely information via SMS about the intermittent supply of local main-line water in Indian secondary cities. This reduces waiting time for water and enables better planning and rationing of stored water supplies. In order to monitor and improve the operations of the water utility companies with whom it works in partnership, Nextdrop also provides a mobile reporting system for the water utility workforce and utilises customer feedback on the quality of water supply received. This provides unprecedented real-time visibility on the functioning of the system, which improves decision making towards the delivery of a better water service.

1 Background

In many cities in India, particularly Tier 2 Cities, the water supply is intermittent and water utility customers only receive a main-line water supply once every 2-10 days, for roughly 2 hours at a

time. Often, it is difficult to predict when the water supply will be available in a certain area, and if customers miss the water supply window then the opportunity has passed for the next 2-10 days. This can be a major problem for people with minimal water storage capacity. While on most occasions this is just an inconvenience, it can sometimes be life threatening depending on the social standing of the customer and their capacity for resilience. The initial concept that inspired NextDrop was for a service that informs all the residents of a city 30 minutes in advance of when the water service will be switched on in their respective supply areas of the utility network, so that they can be prepared to collect and store the water.

Nishesh Mehta, co-founder and Vice President of NextDrop, has extensive experience working with energy and water utility companies and realised that there was a very limited amount of information on which the utility companies could base their decisions to improve their operations and the water supply. NextDrop was built with the utility companies in mind, in order to assist them in improving their efficiency and to provide a better service to various parts of the city. It achieved this by crowdsourcing the information required from the utility company's workforce, and from the end-user customers receiving the water supply in their own homes.

Objective

NextDrop's objective is to improve the performance of water supply in India's secondary cities, for the benefit of both the supplier and the consumer. NextDrop seeks to generate the data-driven operational visibility required to make the most effective improvements to the water supply networks and service. NextDrop also seeks to help the citizens of India's secondary cities to make the most of the intermittent supply they receive, by communicating information on supply schedule and by gaining feedback on the quality of supply received.

Results

- NextDrop first launched in Bangalore, and now also operates in nearby twin-cities Hubli and Dharwad, but continues to expand in Bangalore. NextDrop covers 70-90% or more of the occupants of the areas it serves in each city using its service to receive information about water supply.
- Though many users are receiving information from NextDrop about their water supply, the active user base providing solicited or unsolicited feedback is roughly 10%, but varies city to city. However, many more citizens - more or less the whole city - benefit from overall improvements to the water supply delivered because of NextDrop's work on the utility networks without ever becoming a registered user of the service.
- Nextdrop have become a key partner with the utility companies within their operational cities, and are increasingly becoming an indispensable part of the service delivery by providing the visibility and analytical insights required to provide the best possible service within the limitations of the infrastructure.
- The community bond between the workforce and their customers has become stronger through recognition and appreciation, which leads to a better quality of service for the customers and

more consistent, higher quality data for the utility company, on which to improve the service.

Impact

Residents can use their time more efficiently, having gained time through knowing exactly when water will be available. Historically, the risks associated with intermittent water supply in these regions were avoided through the ubiquitous practice of at least one person from each household staying home at all times to be able to collect water when it became available. One user, a housewife, told NextDrop "You've set me free." She now runs errands and sees friends without worry or guilt over risking her family's water security.

More residents are receiving water supply more regularly than before and utility staff are experiencing increased feelings of empowerment in their jobs. When Hubli-Dharwad's water utility used NextDrop's monitoring tools across a three-month period, over 17,500 families got water when they otherwise would not have done. These families were at the end of their area's supply cycle and would not receive sufficient water if the system lacked proper pressure. By engaging 'valvemen' (ground level staff) to report water pressure when they turned water on, and relaying this to the utility engineers, responsible for decision-making about those areas, NextDrop provided the visibility with which to make real-time adjustments to ensure equitable supply. After this, the ability and willingness of the utility workforce to make decisions was changed because they knew their decisions could lead to improvements.

2 Lessons Learned

- **Donor partnerships are a crucial early part of the project's life cycle, but should not be relied upon long-term.** Though NextDrop ultimately seeks to become funded by and integrated into the operations of its utility partners, donor funding is still accepted as a necessary part of the life cycle for expansion into new cities. Donor partnerships are required for initial installation and early operational costs in each new city until the value of the service has been proven sufficiently to attract long-term and self-sustaining local utility partnerships. The cycle of how to interest the utility companies and how to use this interest to get them on board takes anything between 6 and 9 months depending on the landscape.

- **Keep the design process lean and base it on fast-paced customer feedback.** NextDrop is committed to lean-thinking and user-centricity in its design process and ensures it includes in the end-product only the information or functionality that has been proven through rigorous active iteration to be of the greatest importance to the end-user. In the case of NextDrop's customer-facing product, feedback on iterative tests was typically gained within a week.

- **Language is not always a barrier.** Language compatibility challenges that NextDrop faced were partially solved by using the vernacular that is most universally understood by users, but which importantly is also the most widely compatible with users' handsets. However, the main solution to this problem was simply to assist customers through the learning process to understand how the service works. The simplicity of the service minimises language barriers once a basic level of understanding is reached.

- **There are better incentives than money.** Social incentives such as strengthening the community bond between the workforce and their customers, and professional incentives like performance recognition became much bigger factors for improved workforce performance than financial gain alone. These specially designed incentive programmes were crucial in improving the quality and consistency of data gained by the field-based utility workforce on whom NextDrop relies.

3 Approach

NextDrop created an interactive voice response (IVR) system for the water network 'valvemen' - the manual labourers who go into various areas of the utility network opening and closing the water supply valves to different parts of the city. Every time they would go into a new area the valvemen would call the IVR system to confirm which particular valve for which area of the network they were opening. On receiving this command, NextDrop sends all the citizens of that supply an SMS informing them that their water supply will shortly become active. It therefore becomes a lot easier for the people receiving the water to make the necessary arrangements for water storage.

The design of NextDrop includes a system whereby the citizens can provide their own feedback on the quality of the supply in terms of water pressure, the condition of the water and the length of supply received. This provides a near real-time system for both the supply and demand side of the water utility service. It also provides insights into the operations of the infrastructure itself and helps to identify any inefficiencies that exist or any problems that need to be resolved immediately. This information is all supplied to the water provider so they can make decisions based on this information to improve the water supply.

The water networks in many Indian secondary cities are very old and are in need of repair in many places, and as a result have numerous inefficiencies. Furthermore, the supply of electricity is in itself highly unpredictable and intermittent. The water supply depends entirely on the electrical supply required to power the water pumps. Finally, there is a simple factor of water scarcity. The water demand is roughly twice the available supply in real terms, and due to network problems and the inefficiencies of the system, the water utility companies are unable to supply even that proportion with any kind of efficiency. All these factors combined spell a very complex problem.

In terms of resources, the utility companies are commonly consumed with addressing the series of immediate problems and constantly fighting to keep them at bay just to keep the system operational, with little resource for planning ahead and making operational changes to improve the system in the long run. It is also hard to address these issues without solid information on which to base decisions, and there is limited technical capacity within the utility companies to think up technological solutions in order to gain this information. The founders of NextDrop saw that as an outsider one can see the whole system externally and more easily identify the problems without having to address them personally, and thereby begin to propose broader and more innovative solutions. This is where the external input of NextDrop has really been instrumental in proposing the use of mobile phones in the delivery of the water service.

4 User Centric Attitudes

NextDrop have two kinds of products - the customer-facing service delivering supply information, and the utilities management product informing the delivery of the service. The design process for both is based on a 'lean thinking' approach for iterations, and is almost entirely based on client feedback around what kind of information they need, rather than on any unproven product design hypotheses.

The customer product is slightly smaller in scope. Initially the project started out giving customers information on the timing of their water supply. However, it began receiving a lot of feedback from customers experiencing difficulties because the timing information provided was not precise enough. The project began utilising this culture of feedback to create iterations, such as adjusting an SMS notification, and then to test them by gaining further feedback. The customer feedback cycle was very quick, typically seeking to gain feedback within a week and using this to inform immediate and longer-term decision making. Eventually, a product iteration was reached where customers would be given a range of times that water would be available, and would also be informed of any delays or breakages in the supply, because they were the two pieces of information they had learned the customers cared most about. In terms of gaining feedback from customers, there were some behavioural barriers to overcome. At first, the system relied on customers providing feedback by SMS in return to the text about their water supply, but in reality customers would more commonly make a voice call to the number. In response to this the project designed a binary missed call system whereby a customer dials one number to respond with the binary information 'yes' and another number for 'no'. This system can be limited in terms of the range of detail that can be derived from the feedback, but it also considerably improves things for the customer because it doesn't cost anything to generate a missed call, and there is no bias resulting from having a single number meaning 'yes' and inferring all non-responses as a 'no', or vice versa.

Initially, the data that NextDrop generated was provided to the utility companies in the form of spreadsheet datasets, which were unappealing and rarely used. Maintaining its user feedback based design process, NextDrop engaged the utility companies, who requested a mapping interface for the data. NextDrop responded to this by building a mapping model with the functionality of being able to click through an area and see what the historical trends are, or which engineer is responsible for a certain area. Figure 1 (below) gives an example of this interface.
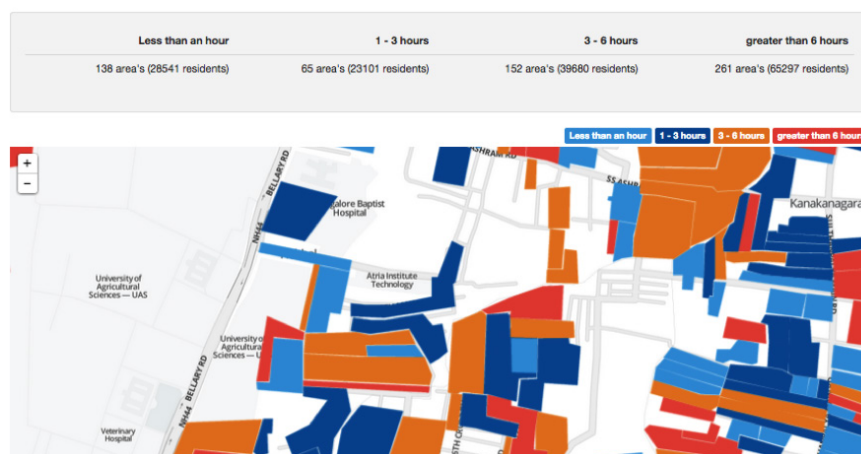

Figure 1 - Snapshot of Nextdrop Interface

5 The Use and Value of Data

NextDrop already generates a lot of data points that have been instrumental in its design and its impact on the utility companies and supply networks with which it works. However, there are many more data points that the project seeks to collect, particularly in relation to the supply infrastructure and network operations. Every location and every piece of machinery that are used in the networks can benefit from an information system - for example the pumps that are being used, when and how long they are in operation and how much electricity they are using, the water levels of the various storage tanks that the systems use, the hierarchy of the valves and the elevation of the pipes. Visibility on this type of information enables data-driven decision-making regarding the water supply in terms of the condition of the system in any given moment of real-time monitoring. Nextdrop are also currently developing a predictive system based on this kind of data, which has the potential to hugely impact the quality of service. A lot of this data is gained from field visits; the NextDrop team are in the field most days mapping new areas to inform these models. A lot of this data also exists within the collective knowledge of the utility companies, but has not yet been aggregated and organised into the intelligent system that NextDrop has in mind. As this system becomes increasingly rich in information and this information gets augmented by customer and engineer feedback, and by previous lessons and historical trends, it will become increasingly effective and will enable the network to surpass its current efficiency levels of 60-80 per cent.

In terms of customer data, the entire design and implementation of the system relies heavily on user feedback data. However, NextDrop are still a long way from being able to build customer profiles that incorporate vital statistics such as income, level of mobile education, and being able to link information about a customer's location and water supply with their existing feedback activities. NextDrop identifies that it would need its customers to be a lot more responsive in order to build these kind of profiles and to make them more broad and dynamic. The project has done some preliminary work on this, and currently this kind of data is gained via the utility workers who deliver water service bills to every household and who therefore connect personally with every customer at least once a month.

6 Success and Scalability

For the customer-facing product, there are three main metrics that NextDrop looks to in order to measure success. The first is the penetration rate of users within a city's population; the number of people receiving information from NextDrop about their water supply, which currently stands at around 70-80%. The second metric is the percentage of this penetration rate providing feedback, both solicited and unsolicited, which currently stands at about 10% but varies city-to-city and month-to-month. The third success metric, which is projected for the future, is to switch as many customers as possible away from an SMS only service to an app. The NextDrop app is still under development but will be able to provide a far richer experience for users and generate richer feedback data.

For the utility-facing operations, the first measure of success is the number of people on the utility network workforce providing information. NextDrop asserts that the incentive systems in place are effective at maximising the amount of information they receive from the workforce, which is the second success metric that NextDrop seeks to apply. The third success metric is to reach the stage at which the utility management and supervisors to start making performance improving data-driven

decisions based on the information that NextDrop provides. It has started to see success along this metric with engineers using the NextDrop data to make real-time decisions.

The final and overall success metric for NextDrop is to ultimately become embedded within the utility companies' institutional behaviours such that they make big operational changes for improvement that affect the bottom and the top line based on the visibility that NextDrop provides.

NextDrop intends to expand to further cities using a 'cookie cutter' model for replication and expansion based on the first three cities. However, since the project is still gaining scale and has not yet reached its full potential, utility companies in other cities may be unwilling to pay for the initial installation of the NextDrop system and the first year of operations, or to provide the resources by which to integrate NextDrop into the utility company's' operations. There are also challenges in gaining the trust of these partners for them to overcome perceived risks, and to convince them that the project will be sufficiently lengthy to make valuable changes in the system. It took about 9 months for NextDrop to get the first utility company to see the value of the project and to take them board on as a partner. Initially this partnership was a non-payment partnership, meaning the utility company did not financially support NextDrop's operations, which instead relied on customer generated revenue for a paid service.

At first, Nextdrop started out charging its customers about 200 rupees ($0.10 USD) per month for the service in order to cover operational costs. However, once the system was implemented and the results started to be proven the utility companies became willing to pay for the service because of the valuable information that NextDrop provides. At this stage, NextDrop can become a free customer service for which the customers are only used as a source of feedback rather than revenue. Reaching this stage requires funding for initial installation and early operational costs, and therefore NextDrop has thus far relied upon, and will continue to rely on donor funding for the early stages of implementation in each new city it reaches. This may limit sustainability and scalability to some extent, but it is accepted as a necessary part of NextDrop's life cycle for expansion and is therefore built into the business model, which is designed with scaling in mind. The cycle of how to interest the utility companies and how to use this interest to get them on board, takes anything between 6 and 9 months depending on the landscape.

Figure 2 - Predicted lifecycle for expansion

Within its current operations in Bangalore, Hubli and Dharwad, NextDrop has achieved phase I and is currently in Phase II, predicting completion of Phase III by 2017.

7 Partnerships

The crucial role that donor funding plays in NextDrop's expansion lifecycle highlights the importance of donor-partnerships. During the inception of the company, NextDrop was awarded a seed grant through Knight Foundation's Knight News Challenge. NextDrop has also received equity investment from Social + Capital Partnership, and in 2014 received a seed grant from the GSMA Mobile Enable Community Services (MECS) Programme's Innovation Fund.

NextDrop's primary partners are the Bangalore Water Supply and Sewerage Board (BWSSB) and respective water boards in Hubli and Dharwad. NextDrop is looking forward to strengthening these partnerships and seeing yet more positive results come out of them. Operations are expanding rapidly in the city and providing a lot of data to every level of the organisation. NextDrop asserts that even small changes in the decision making process at the operational level can have a large systemic effect, and is encouraging the water utility companies to start using the data generated by the system data to make better decisions.
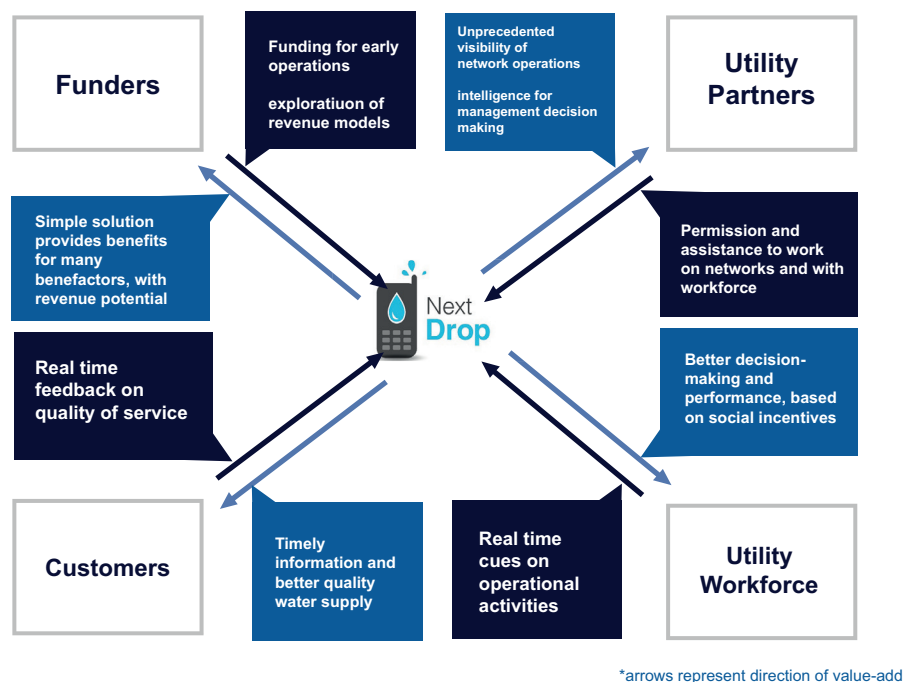

Figure 3 - Partnerships diagram

8 Challenges

The project experienced language compatibility problems because many of its customers use cheaper Chinese handsets that don't recognise vernacular text, meaning that those pieces of text do not show up in the SMS from Nextdrop. English language has been used, but a lot of NextDrop's customers still don't speak English and so cannot read the contents of the SMS. In this instance, customers would typically recognise the name of the sender as NextDrop, and then would assume that the contents of the SMS were announcing that their water supply would be provided shortly. However, it could also be a notification about delays or cancellation to their supply, or any of a

number of possible reasons for receiving a text from NextDrop. The project has managed to partially solve the problems with language compatibility by using the most widely compatible vernacular for both users and their handsets, but the main solution to this problem was simply to get the customers through the learning process of how the service works. The simplicity of the service minimises language barriers once a basic level of understanding is reached.

Another problem that NextDrop faced was gaining consistent and accurate information from the utility company workforce in the field, who often required training on how to use a mobile phone, how to use an IVR system, and how to be consistent in their information.. In response to this NextDrop built an entire incentive programme by which users earn points for participation and can then redeem those points for mobile airtime or other prizes. A further layer of incentive to this is achieved through a direct interface between these workers and their superior officers, who monitor progress and performance using the NextDrop system. Gaining recognition for good performance became a much bigger incentive than solely for financial gain. NextDrop then added a social incentive scheme, whereby the workers are specifically portrayed as local heroes for providing the citizens of their district with precious water. The community bond between the servicemen and their customers becomes stronger through recognition and appreciation, which leads to a better quality of service for the customers and more consistent, higher quality data for the utility company, on which to base improvements to the service. Many of the manual labourers on the utility networks don't have a very high social stance, but NextDrop has striven to change this because these workers are doing a valuable public service, often for relatively little money. The social implications of providing utilities to the people, and providing information to the utility companies gives them a greater sense of pride in their work and leads to improvements for all parties.

9 **Future Plans**

Gaining richer feedback from customers is sought to enable more insightful analytics and greater operational clarity. Though the value of the basic SMS platform is valuable in terms of accessibility within the Indian market, Nextdrop is developing an app that can provide a far richer end-user experience while also gaining richer feedback data, and hopes to switch many of their customers towards this and away from a pure SMS product. The company preliminarily predicts the data-enabled smartphone penetration rate to be around 12-15% in the Tier 2 Cities of Hubli and Dharwad, and intends to test the viability of delivering the service over data networks by conducting a trial using WhatsApp.

NextDrop sees value in the replacement of hand-delivered bills with mobile bills, since the former is much more time consuming and cumbersome, and can pose problems if people are not home to receive their bills. Nonetheless, it remains important to NextDrop to maintain some personal interface with its customers, though these visits could be more targeted and personalised to challenging supply zones or customers who are experiencing problems and require help, making customers feel more valued.

NextDrop is extremely keen to see key decision makers within the utility companies begin making big operational changes based on data-driven decisions informed by NextDrop. Once decisions like this are made because of NextDrop's implementation, then the system would become embedded within the network. The customer service system and the untility management system could be based on NextDrop, and then the whole water utility system will have changed for the better. This is the vision that NextDrop's founders foresee for the service, and believe that once this behaviour becomes

embedded, then it could become influential in beginning a movement to tackle other problematic public services such as energy and transportation. By using the model for the stages required for solving one systemic problem like water utilities, the learnings will certainly have applications in other areas.. These operational institutions and citizens alike could benefit from systems such as NextDrop to provide them with unprecedented visibility within the system and enable improvements throughout.