

Customer Journey & Water supply timing

Case Study – Nextdrop's water supply timing service in urban India

Contents

1. Overview of NextDrop organisation and key problem
2. Snapshot of NextDrop business model
3. The end-user’s journey
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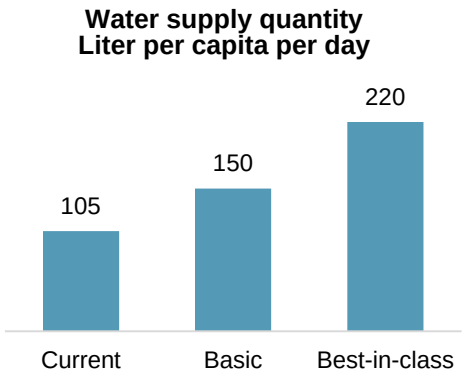
Project & Organisation Overview: A quickly growing service combining data from different categories of individuals

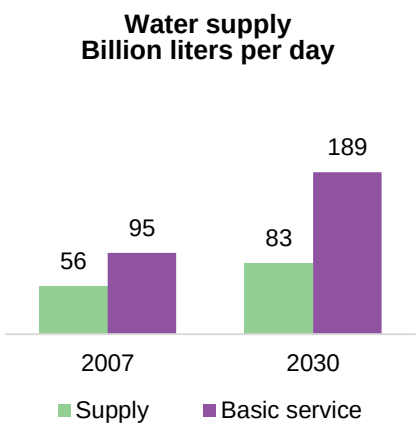


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NextDrop provides critical information on water supply to end-users

- Water **supply** is scarce and **unreliable** in many Indian cities and massive investments are required
- The issue is even more acute in **Tier 2 cities** where capital spending is low





- NextDrop leverages mobile technology to provide **critical information by SMS on water supply** to households with a meter-reader
  - **End-users** can save time
  - **Utilities** can leverage the collected data to improve the network

Company Overview | Product Overview | Performance Overview | Key Problem Overview

NextDrop geographical presence



Tier-2 cities in India



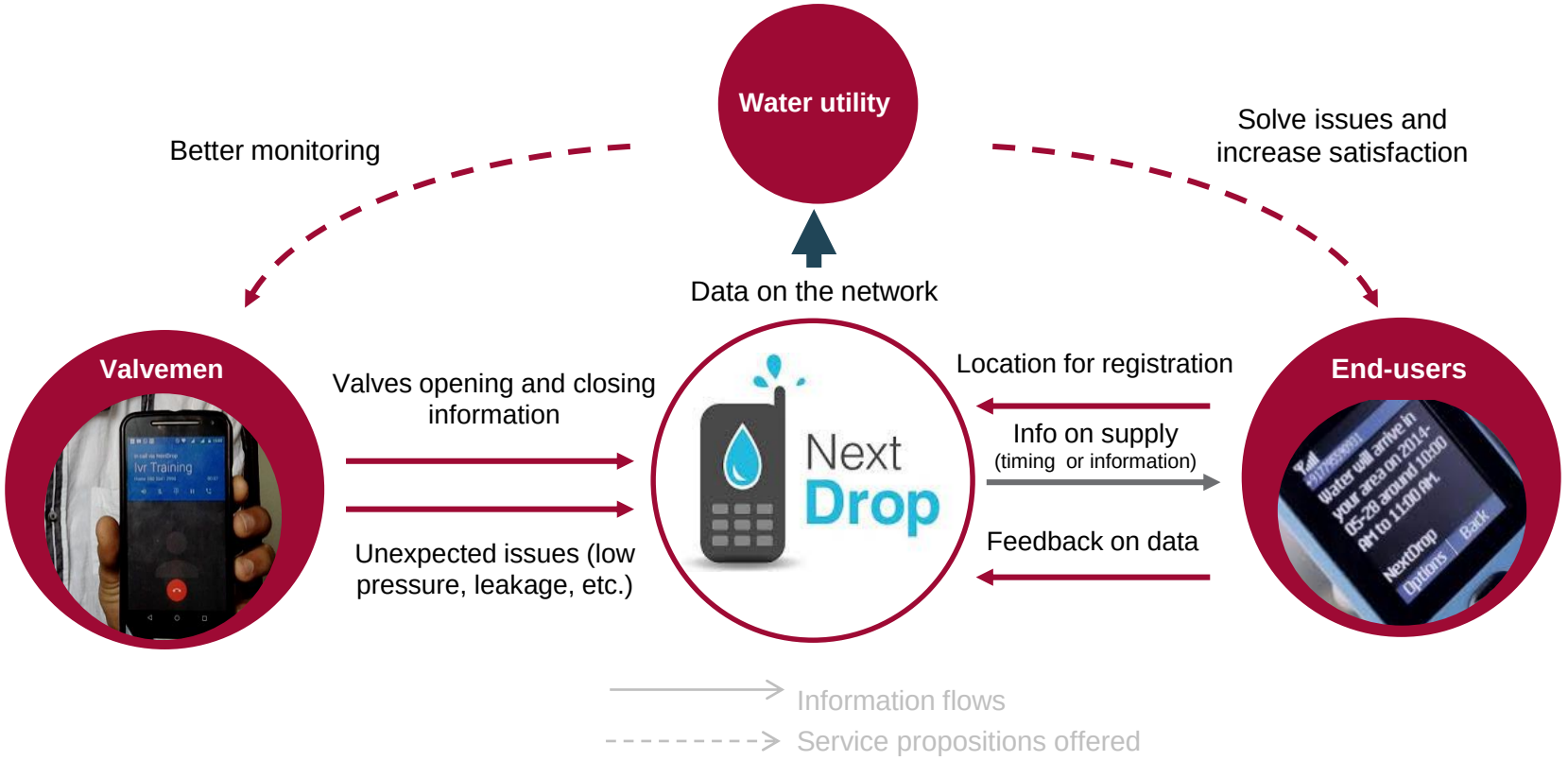
- **66** Tier-2 cities
- **1.3 million** inhabitants on average
- **3 Tier-2 cities per state** on average

Sources: McKinsey Global Institute, Government of India, High Powered Expert Committee, interviews

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The service is a platform combining data from end-users and valvemen

- The **accuracy** of the service relies on the **data** shared by two categories of individuals:
  - **Valvemen**, to accurately anticipate the **supply times**
  - **End-users**, to ensure the **mapping** of the **water network** is **accurate**



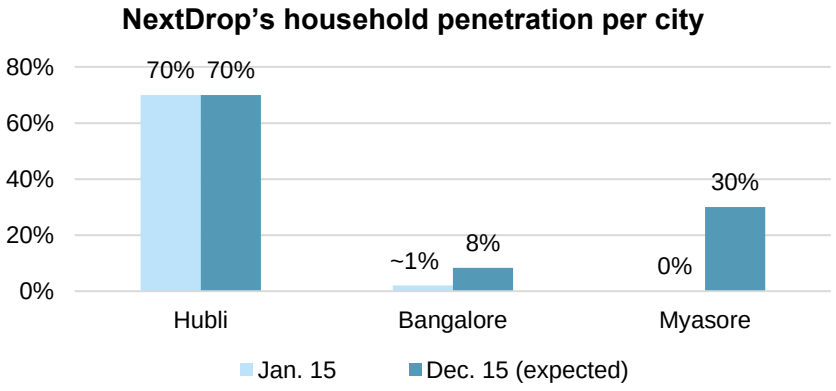
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Sources: interviews, GSMA and Altai analysis

The customer base is expected to grow sharply in 2015

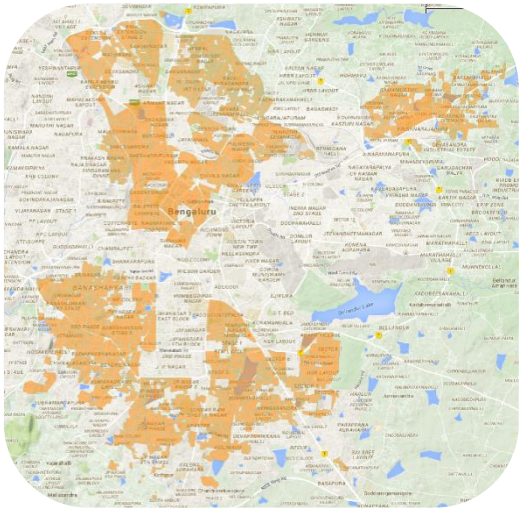
User reach

- NextDrop has **about 40k users**:
  - The **bulk** of them are in **Hubli**
  - In **Bangalore**, there is closer to 10k users while 6m individuals are covered by BWSSB services
  - In **Mysore**, NextDrop must reach 45k active users by the end of August



Focus on Bangalore

- This report will **focus** on **Bangalore**:
  - This is the **largest city**
  - The **reach** should **increase significantly** in the coming months (60% of the city is yet to be covered)



Map of areas covered by NextDrop in Bangalore as in Jan 2015

Sources interviews, GSMA and Altai analysis

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Key challenge is to collect more data from both valvemen and end-users

To scale quickly and effectively, NextDrop needs to lift barriers with

Valvemen

To get **accurate data quickly** and at **limited cost**, NextDrop needs them to:

- ✓ Inform systematically when they open and close valves
- ✓ Move from IVR to the new app to reduce costs

This is a requirement to build a precise **mapping** of the valve **network** and accurately **inform** end-users

Set the right incentive structure

End-users

To **refine the water network mapping**, NextDrop needs them to:

- ✓ Register easily, with an accurate location
- ✓ Confirm accuracy of messages
- ✓ Inform of other water issues

Having **engaged** and **satisfied** end-users is the best way to make the service **attractive** for **utilities** and large (esp. **FMCG**) companies

Make providing feedback easy

Sources interviews, GSMA and Altai analysis

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The project combines data analytics and qualitative & quantitative research

End-users and valvemen are treated separately

- The NextDrop service **relies** on **two categories** of individuals (end-users and valvemen) and **different types of data** are collected from them
- The **levels of involvement** and **incentives** of both categories **vary** significantly
- It is logical to treat **them separately**

The approach combined data analytics and additional research (quant and qual)

- The project relied on two **different but complementary approaches**: **data analytics** and **qualitative research**
- The data **analytics** aimed at:
  - **Quantifying** the various steps
  - Identifying the key **bottlenecks** in the journey
- The **quantitative research** (on ND users) :
  - Quantifying **perception** (esp. on the service)
  - Assessing **satisfaction**
- The **qualitative** approach focused on:
  - Assessing the **rationale** behind behaviours
  - Better understanding **real-life situations**

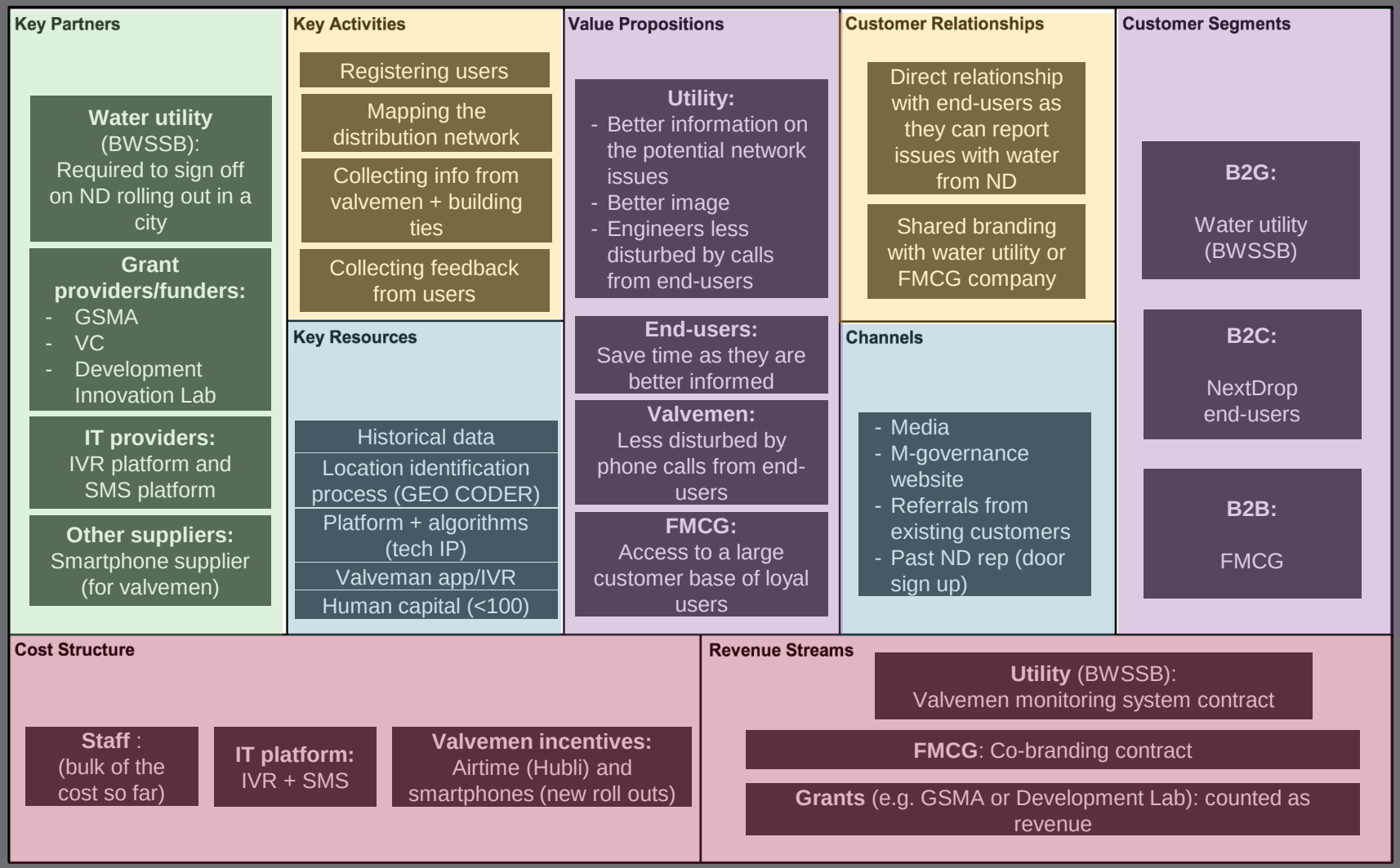
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Business Model Snapshot:
A product and revenue model still fast changing through iteration

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Spotlight

An overview of the business model



Customer Value Proposition | Partners | Key activities/ relationships | Key resources/ channels | Cost/Rev structure

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Several types of customers, but one key partner throughout

1 A story of 3 value propositions for three "customers"

2012-2013: **B to C**
- Abandoned at the end of 2013

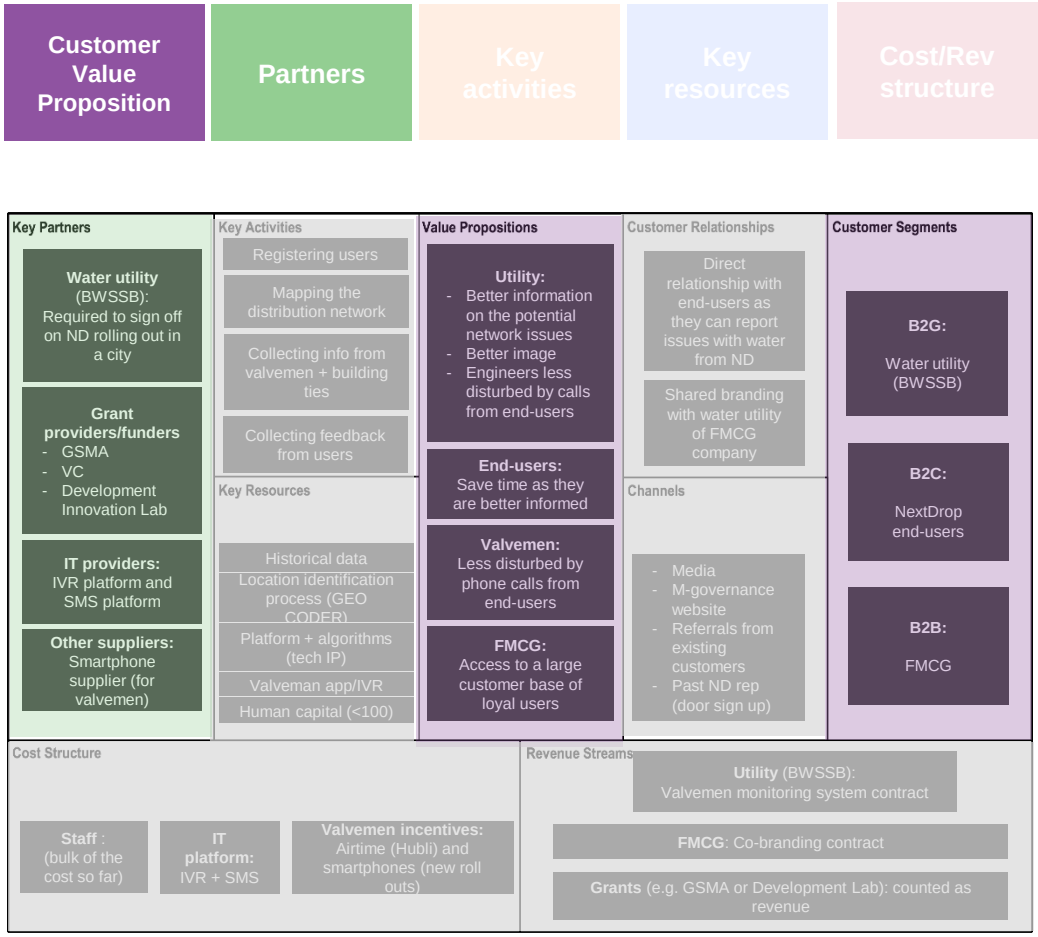
Since 2014: **B to G**
- Getting utilities to pay is difficult – hopefully start in 2015

2015-Present **B to B**
- Contract with FMCG for sponsored SMS

- **Quite different value props for each**, "saving user time", "operational improvements", "brand awareness and perception"

2 The utility will remain critical partner, whether a customer or not

- The utility provides **access to valvemen** and key information that is the **main resource** for the service in any of the above scenarios
- One of the issues for NextDrop is to ensure that valvemen have **the right incentives** to use the service actively



Sources interviews, GSMA and Altai analysis

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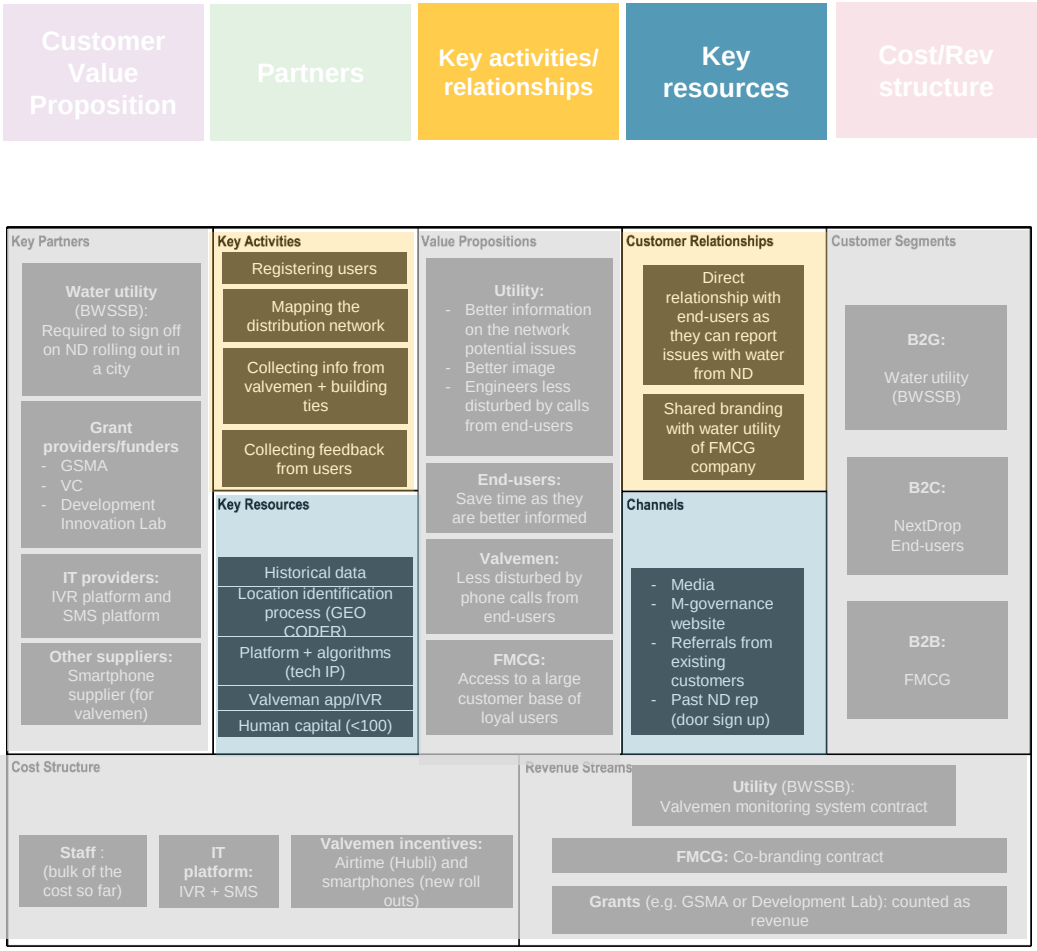
ND is automating activities and resources to scale up

3 Some of the key activities are being automated and standardised

- **Localisation** of individuals during **registration** should be done **automatically** with 2-way SMS
- **Unsolicited feedback** is expected to be **easier** and more comprehensive with the **users app**

4 Similarly, resources and channels are being transformed to be able to deal with larger volumes

- The **valvemen app** should provide more **complete data** and **reduce costs** (calls to toll free number are more expensive than data costs)
- The **web channel** is being **further developed** while media campaigns and door-to-door recruitment are stopped



Sources interviews, GSMA and Altai analysis

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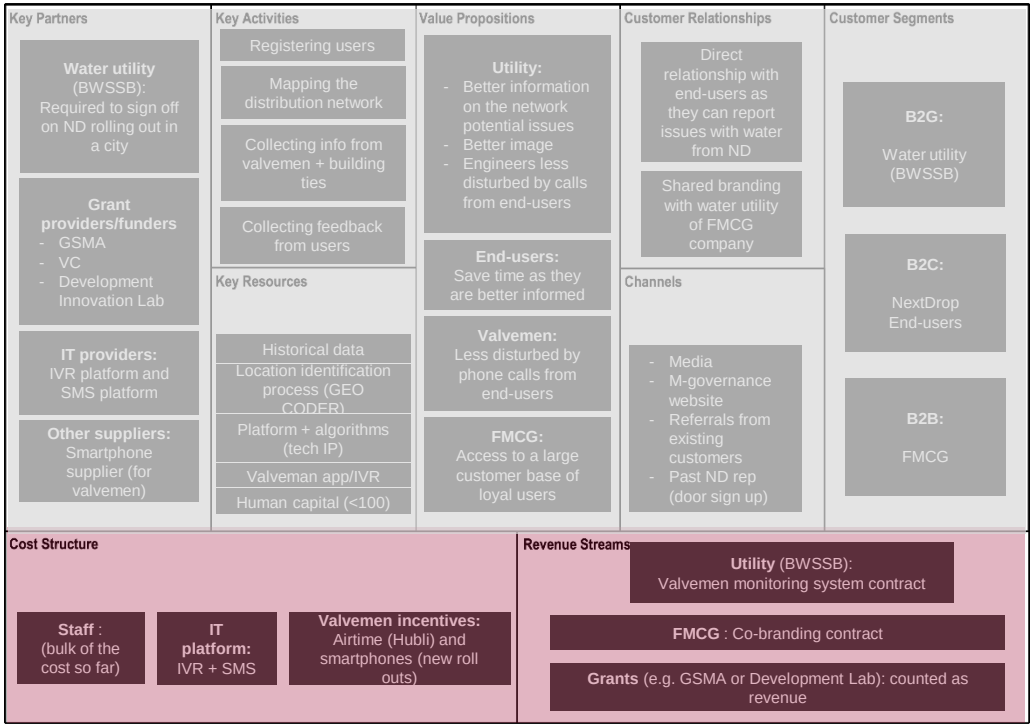
This automation is paramount to make the first contracts profitable

5 **With a range of revenue sources, must be careful of quickly escalating costs**

- **BWSSB contract** (B2G model – to be completed by the end of 2015)
- **FMCG contract** (B2B model – Jan to Aug 2015)
- Main concern: findings sources of **recurring revenues**

- If **registration process** remains the **same** while volume increases, **costs** for NextDrop will be **massive**
- Still **unclear** what costs will be associated with **valvemen incentives** (e.g., Hubli incentives costly, smartphone app not enough!)

Customer Value Proposition | Partners | Key activities | Key resources | **Cost/Rev structure**



Sources interviews, GSMA and Altai analysis

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Mapping the end-user's journey: A useful product generating many expectations with little engagement



Individuals who contacted ND to be registered

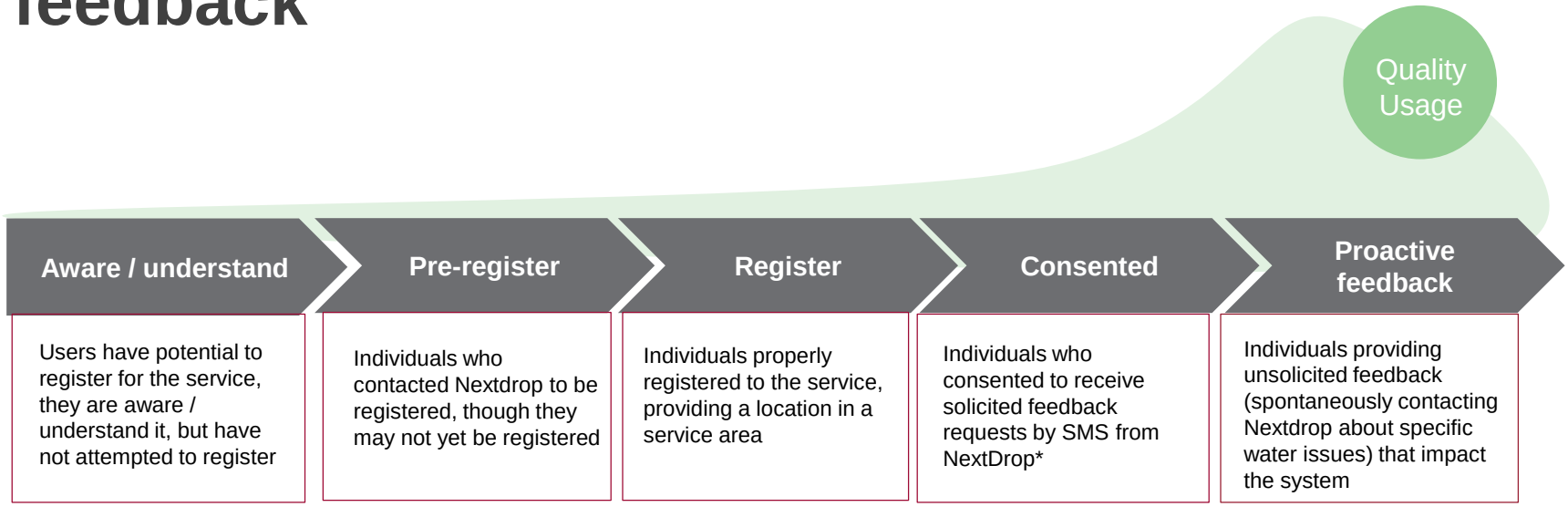
Individuals properly registered i.e. with a valid location in an area covered by the service

Individuals who can provide feedback

Individuals providing unsolicited feedback

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The end-user's journey is based on several key steps leading to users' feedback



- The journey does not account for a **necessary path** since:
  - There is no reason to provide unsolicited feedback if **there is no water issue**
  - Users who did not consent to receive solicited feedback request can still provide unsolicited feedback

- However, such a path makes sense as **users providing feedback are the most sought after**:
  - **Water supply issues** are **very common** in Bangalore
  - They help NextDrop bring **more value**

Note: (*) According to the law, getting users consent is mandatory to send them such solicited feedback request

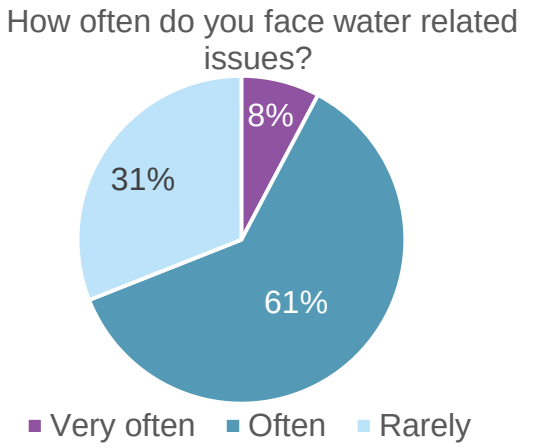
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Very positive brand awareness among users

- NextDrop has the potential to **fill an important need**
  - Helping users **plan their day** and free up time
  - Sending important **reminder**
  - Giving users **peace of mind**

"NextDrop lets us know when the water is coming which reminds us and allows us to do other things instead of waiting" – Regular user, female

- Users believe this type of **technological solution** is the **future**
  - They have a **trust in technology** and see it as a means to solve problems



- They appreciate NextDrop's responsiveness
  - NextDrop **always call back**, making people feel cared for
  - Users describe the **team** as nice, helpful and friendly
  - People are **fed up** of calling the **water utility** and **valvemen**

"The Water Board are so rude to me now and my Valveman just tells me that he has opened the valve. I am glad I can call NextDrop, they listen to me" – Regular ND user, female

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However, mobile usage is more of a concern than awareness

- **Water supply** is a **strong concern for** many households
- Potential demand is thus massive and **awareness does not stand out as the real concern**

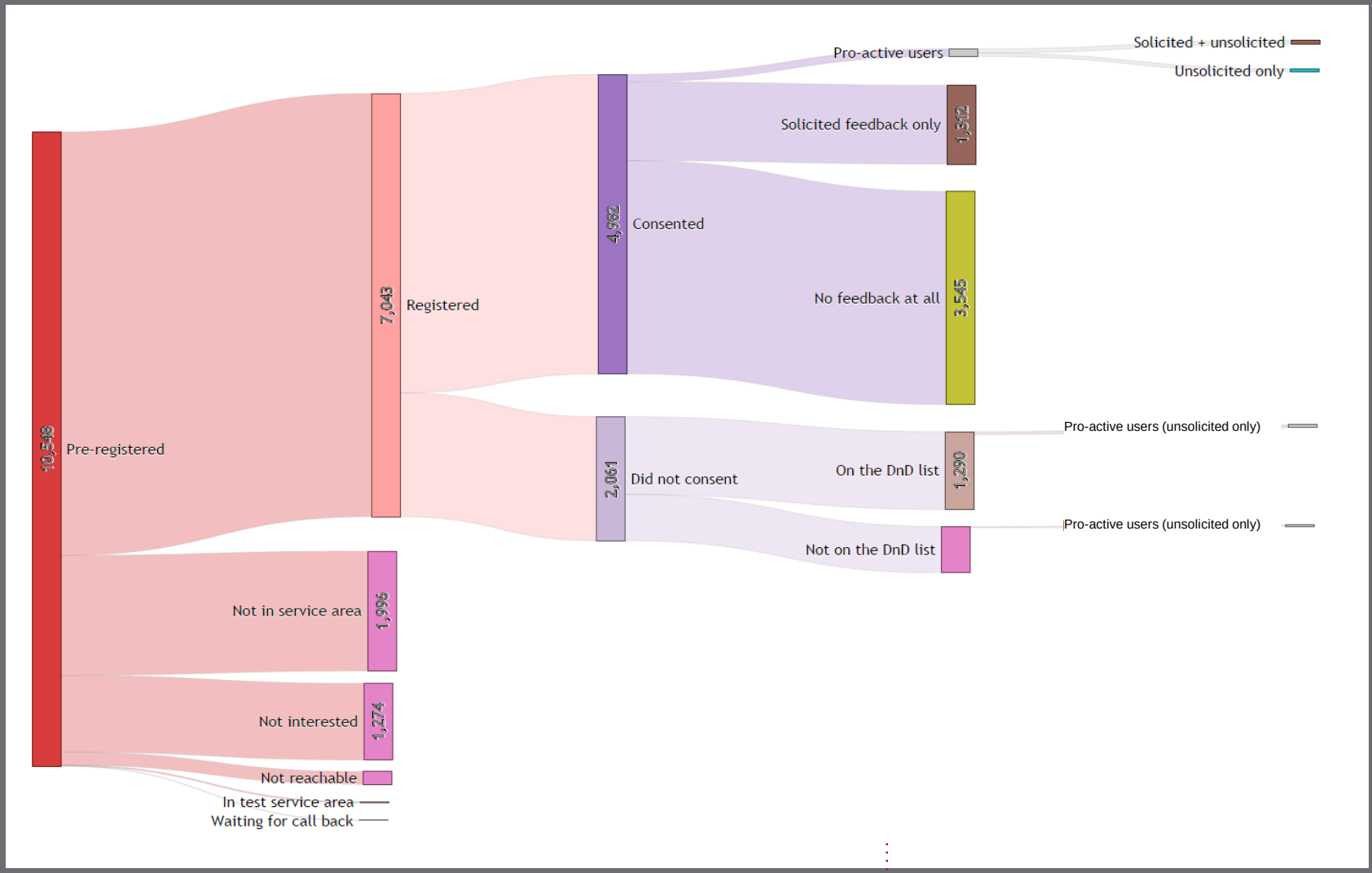


- **However, the service cannot be used the same way across the board:**
  - **Families often share a mobile phone**: the message might not be read by the person who needs the information
  - **Tech literacy can be an issue**, esp. for the lower income groups and women (who are the main users)

"I don't know how to open or send a text message, I just use my phone for calling. My husband calls me when he gets the message to tell me the water is coming" – Regular ND user, female

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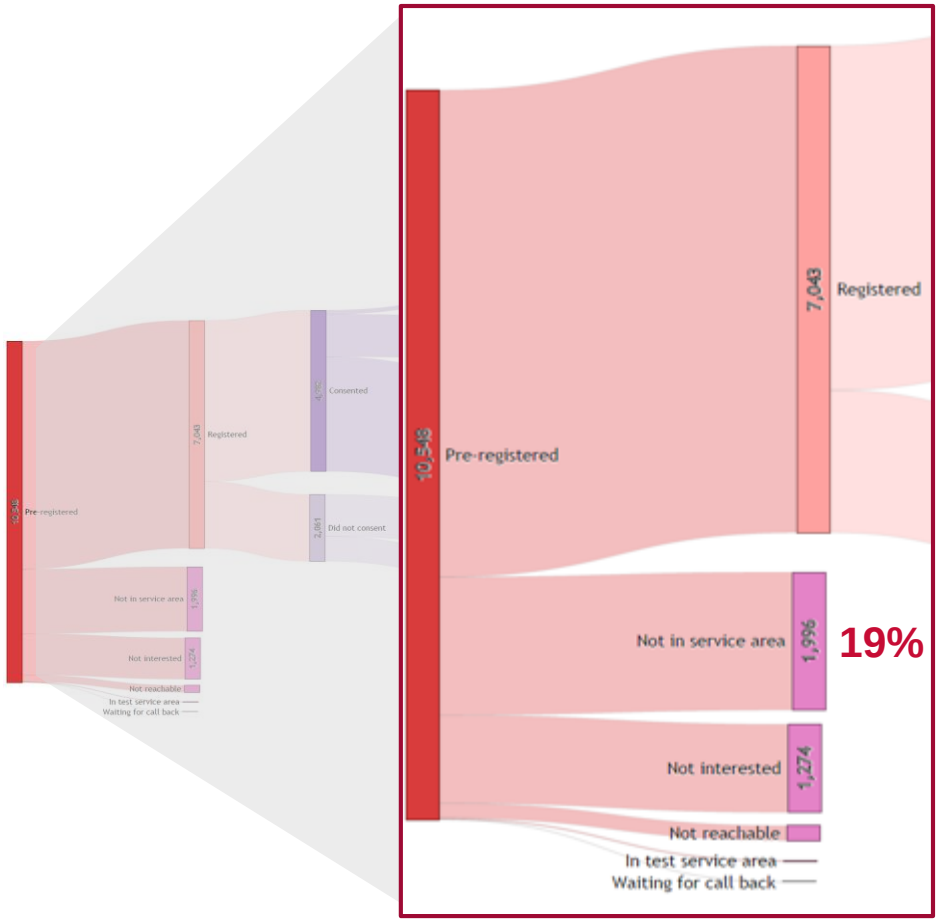
Overview of the end-user's journey from pre-registration onwards



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~20% of pre-registered users are not in a covered area

There are 10,566 residents NextDrop's Bangalore database



- Individuals need to make **first contact to ND** (via their mobile or the Internet) to **pre-register**
- The end user does not know in advance which areas are eligible and that ND only covers part of the city
- While it is logical that some individuals will end up outside the service area, there seems to be a misallocation issue:

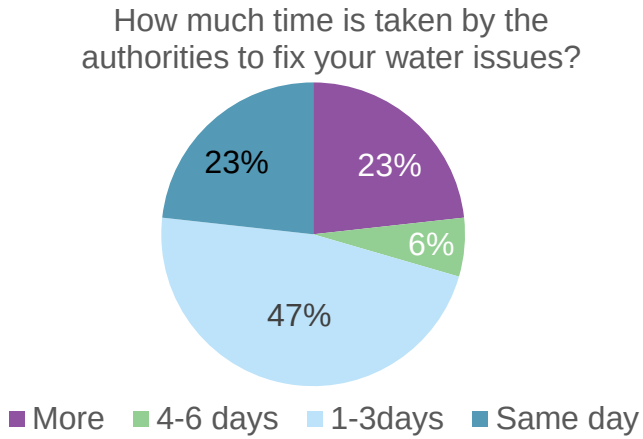
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* Note that the 'not interested' user category is inflated because residents who called in from multiple SIMS were logged in the database under this category

Of registered users, the service is not well understood

- People think NextDrop **will help them with water supply issues**
  - Customers are positive about **NextDrop**, seeing the service as able to help them **overcome water challenges** – issues that otherwise take time to get solved (cf. chart on the right)
  - Some people have **high hopes** that it will solve all their water problems





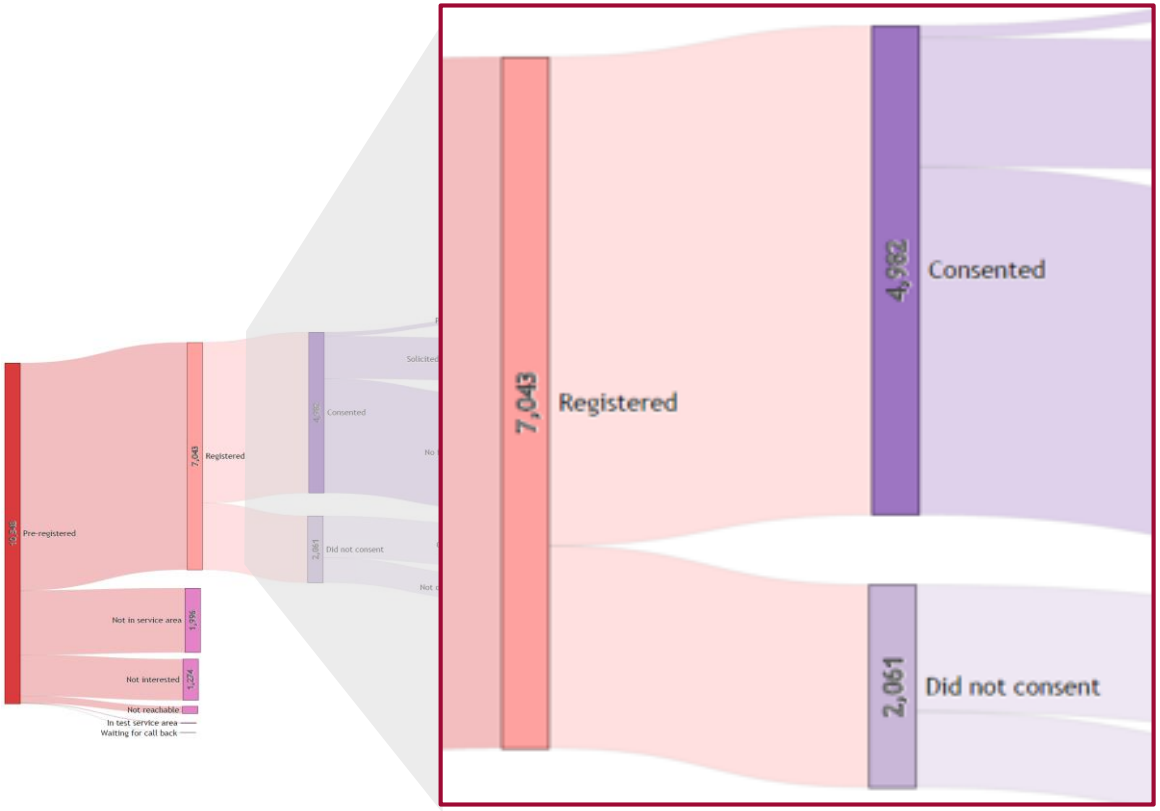
- Users are **looking for a quick solution** to their instant problem

- But users **don't understand that their feedback is required** to improve the service

"When I first heard of them I was so happy I thought NextDrop would solve all my problems" – power user, female

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About 30% of registered users did not give consent to be solicited



- **Consent** is a **required step** for NextDrop to be able to send a **solicited feedback** request
- A majority of those who did **not consent** (63%) are on the **DnD** (Do not disturb) list

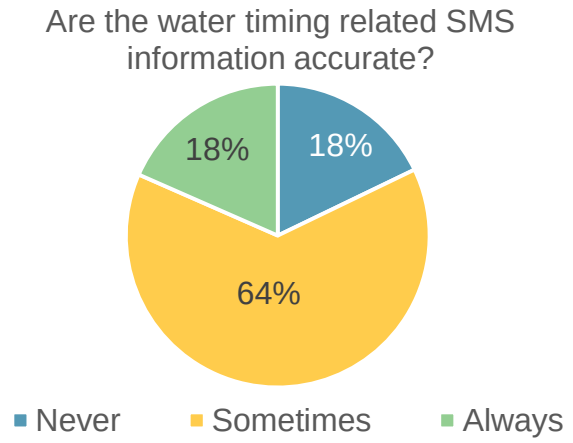
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Users claim the time provided by ND is rarely correct

- Most customers found that the **time provided** in NextDrop messages is **often inaccurate**
  - The **time** the water arrives **doesn't match** the time given by the service
  - Sometimes the text arrives before the water, but **often a few hours after the water has come**

"I have been using it for 6months and it has only ever been correct twice" – Power user, female

- Additionally, the **frequency of the messages lacks consistency**:
  - Messages will stop altogether for a period of time, even though the water is still coming



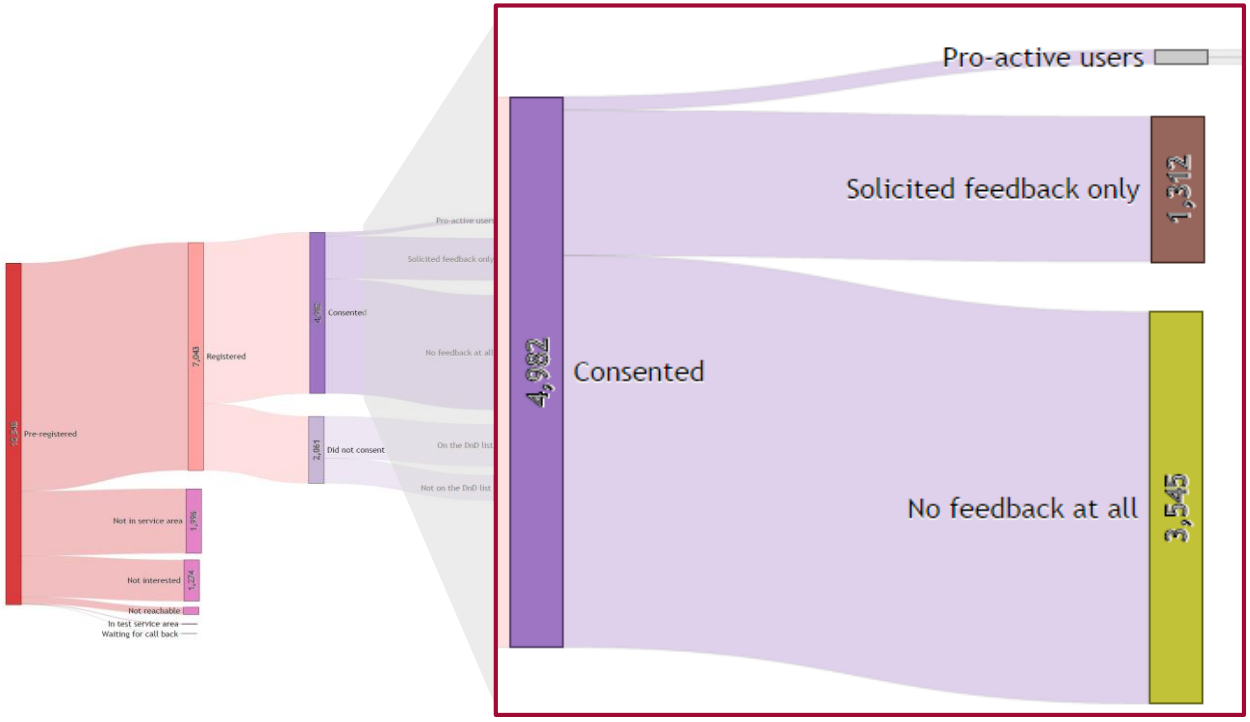
- A majority of customers are receiving messages on the correct day so some learn to **use the information for the day only and don't trust the exact time frame**

"I used to get the messages, but for the last week I have received none. I don't know why – the water is still coming" – Regular user, male

"Always the day is correct so it will remind us that water is coming that day" – Regular user, female

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More than 70% of consenting users never provided feedback



2%

26%

71%

2.7 Average number of feedback requests received by active users over entire period assessed

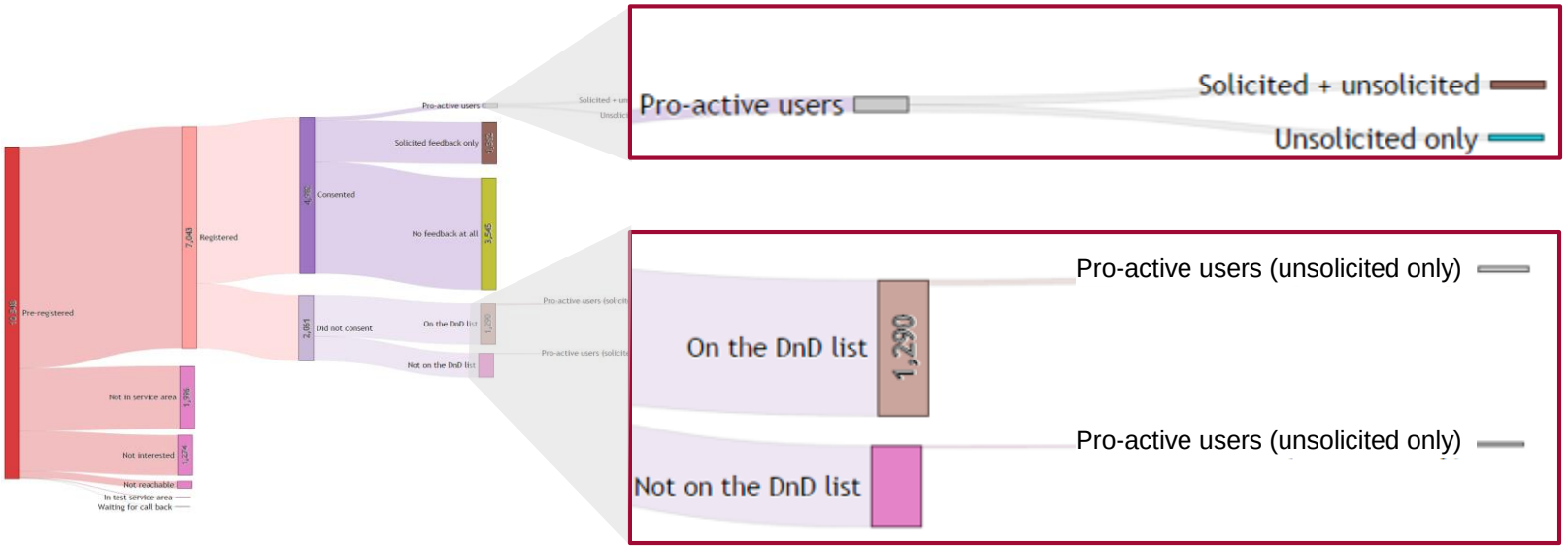
75% Of those who provided solicited feedback did so only once

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Unsolicited feedback is very limited

Low water pressure (lwp)
Dirty water (dw)

- The **two tags** used determine "**high quality"** feedback
- The objective is to focus on feedback that **really impacts the system**



<3% **Of registered users are pro-active**

1.3 **Average number of unsolicited feedbacks per pro-active user**

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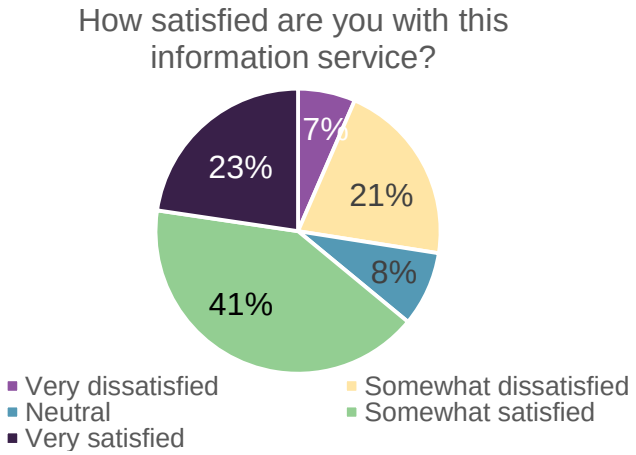
Misunderstandings of the service could create disappointment

- After calling, people **don't see any change:**
  - Users want NextDrop to be **able to take action** and resolve their water problem
  - In time, they realise the service **does not have the capability**
  - Users often have high expectations of NextDrop and **feel let down** when the service does not meet expectations

"NextDrop give a good response but no solution"

"I feel good when they respond, but angry when the water doesn't come" – Power user, female

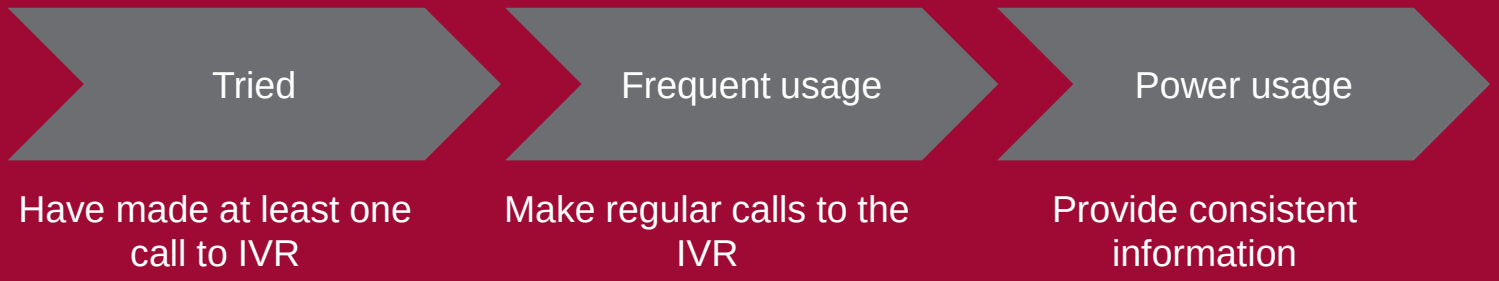
- This presents **a risk of drop off**
  - Users who have **called multiple times** eventually stop giving feedback, realising that NextDrop can't directly help them with their water issue
  - There is a danger they **resort to calling the valvemen directly**



"When I first heard of NextDrop, I was so happy I thought they were going to solve all my water problems, but with time I have realised they can only speak to the valvemen and the Board the same way we can" – Power user, female

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Mapping the valvemen Customer Journey: A service too constraining to lead to a systematic adoption



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A customer journey is also mapped for valvemen



Optimum valvemen usage depends on providing frequent and consistent data

Valvemen provide critical information about the water supply network and their routine is supposed to be fixed each day. The kind of recorded usage that the water utility wants to see is therefore frequent and consistent. We can map a separate journey of usage recorded by a mobile application (in this case an Interactive Voice Response [IVR] app) for valvemen

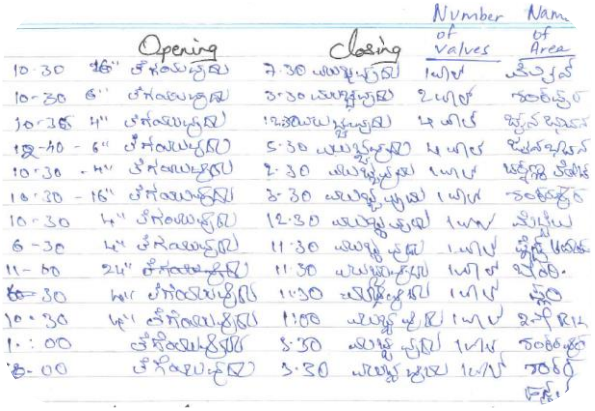
Quality Usage

Aware / understand	Registered	Tried	Frequent usage	Power usage
Users have potential to register for the service, they are aware / understand it, but have not attempted to register	Valvemen have been registered on the Nextdrop system, and have the potential to log valve open/close actions via IVR	Valvemen have made at least one call to IVR	Valvemen make regular calls to the IVR over the period that they are a user on the system	Valveman provides consistent information, meaning that they exhibit a stable routine behaviour

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Valvemen chase the clock to follow their tight routine

- Valvemen have a **set routine**
  - Opening and closing their valves at the same time every shift in a set routine - '**like clockwork'**
  - The routine is **learnt from the last valveman** in training and potential changed by the Associate Executive Engineer (AEE)



- Valvemen are constantly **chasing the clock**
  - **Sticking exactly** to the schedule is paramount
  - They often work **long shifts** and have to **find shortcuts** to speed up their job

"The most important thing is to open and close the valves on time. Everything else has to fit around that"
– Valveman, ND user

- But they **always** get **interrupted**:
  - Responding to **people reporting problems**
  - **Finding** leakages/blockages/damages to the pipe
  - Checking **water pressure**
  - **Reporting** to the AAE or inspector

"I reopen some of the smaller valves at the end of my shift so that when I open the big valve the next morning the water will automatically go through" – Valveman, non-ND user

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Valvemen play an important role but are not recognized for this

- The valvemen are **proud of their job** and its importance
  - They **Care** about getting water to people
  - They want to provide water as **best they can**

"It is very satisfying when I can provide water because it is something everyone needs so much"

– Valveman, ND user

- They are facing **increased pressure** and demand
  - Their **workloads have increased**, as more valves are added
  - Public **demand** for water has **increased faster** than **supply**, leading to more water problems



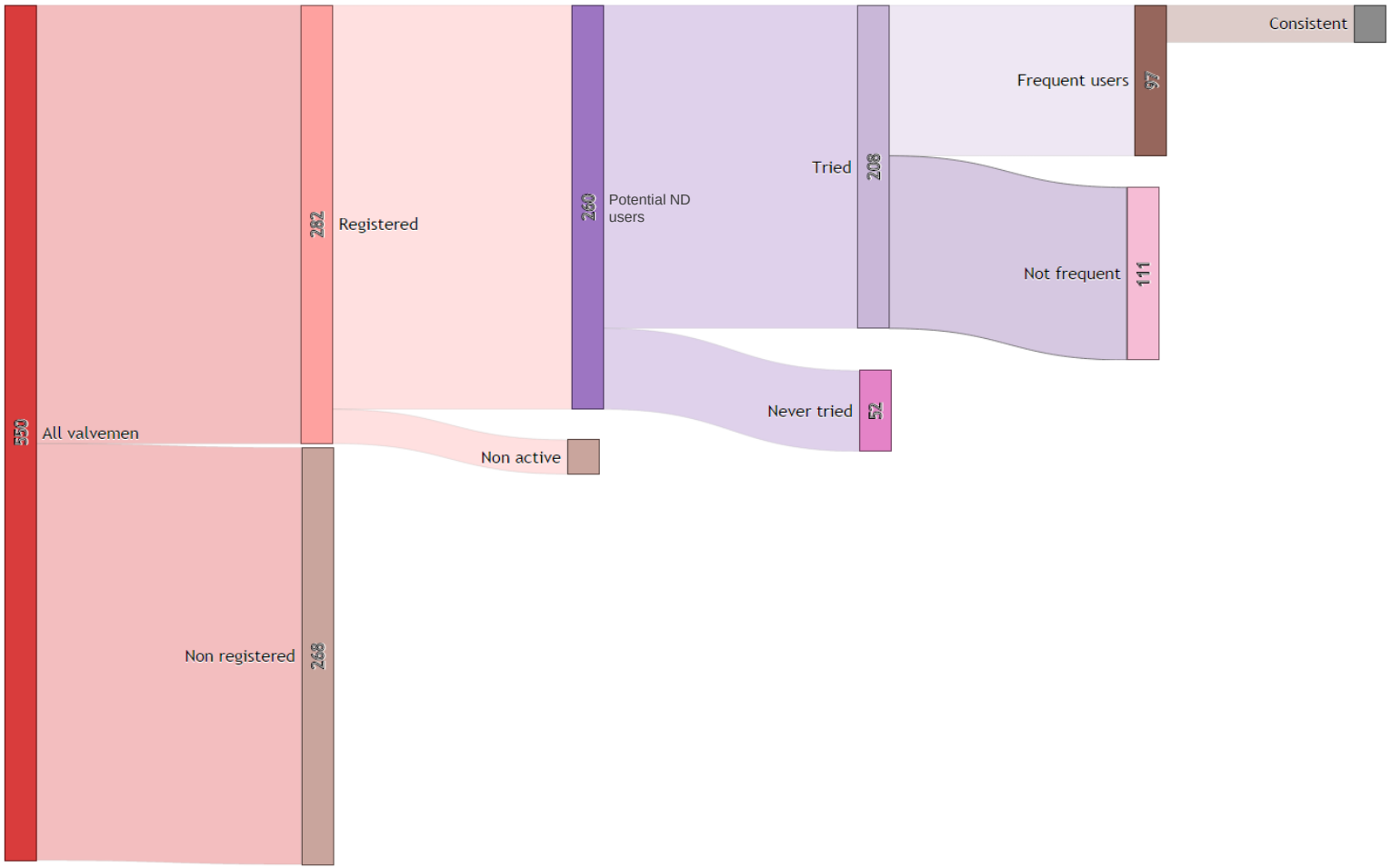
- Valvemen feel they **lack recognition** for their job
  - They have a **bad reputation** as the public blame them for water issues
  - Valvemen experience **constant phone calls** of people shouting at them and occasionally suffer physical abuse
  - They work in **isolation** (limited contacts with the engineers and other valvemen)

"People chase me in the street and shout at me"

– Valveman, ND user

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Overview of the valvemen journey

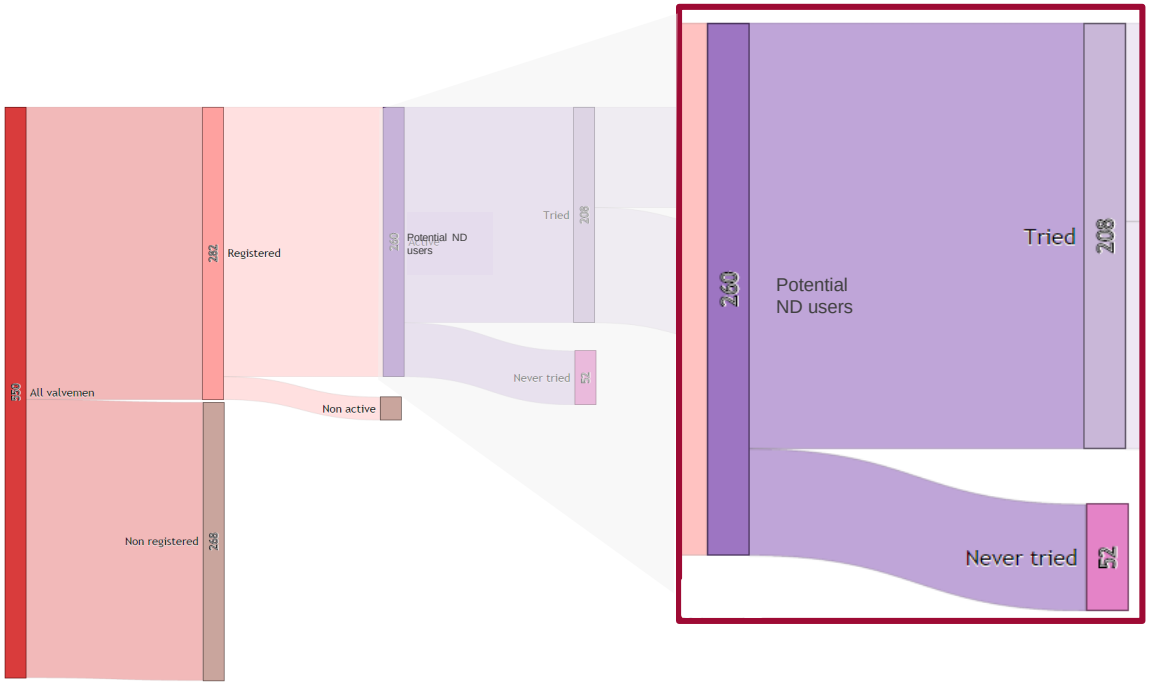


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Close to 40% of valvemen in Bangalore have tried Nextdrop

Tried | Frequent usage | Power usage

- A **small majority** (51%) of valvemen are **registered** in ND database
- The **bulk** of them are **potential ND users** (i.e. they have not changed area, died, retired, etc.)
- 80% of **these Potential ND** users have **already tried the service**



38%

of all valvemen in Bangalore have tried the service

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Unregistered valvemen are aware but not eager to use Nextdrop

Tried | Frequent usage | Power usage

- They are **fully aware** of NextDrop but don't want to use the system
- Their main concern is that it is too **time-consuming**

"I don't want Next Drop to be calling me up as well" – Valveman, non-ND user

- They are also wary of NextDrop **getting involved in their job**
  - Think it will be yet another person involved which is not necessary
  - Don't see the benefits of them helping to handle public's complaints

"It is too much to add to my day – if I have to do NextDrop as well, when will I eat my lunch?" – Valveman, non-ND user

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Nearly half of valvemen who tried Nextdrop are frequent users

Tried | Frequent usage | Power usage

Objective

- Identify valvemen using the service **to provide end-users with information most of the time**

Challenge

- All valvemen do not work **the same number of days** in a week

Solution

- We selected valvemen with a **ratio of 0.4** or above between their **number of active days** and the total **number of days over the period** starting with their first activity and finishing at the last available date for the data

Example

- A valveman has been reporting data since the 1st of August 14. He has been providing data for 26 different days vs the 181 days between 01/08/14 and 28/01/15. His activity ratio is then 0.14 (< 0.4). He is not providing data regularly enough to be considered a frequent user



47% valvemen have already tried

18% of all valvemen can be considered as **frequent users**

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*To be noted: the very large majority of frequent users were still active at the end of the period

Power users are defined by the frequency of the routine

Tried → Frequent usage → Power usage

Several approaches could be considered to determine Power users

Stability of the routine

- Valvemen are supposed to follow a **strict routine**
- It can be assessed by **comparing with the schedule** (currently not exhaustive) or with a **median opening sequence**

Respect of the timing

- This is key to provide **predictability to end-users**
- They prefer to get their water at the same time which helps them to organise and free up time

Opening and closing

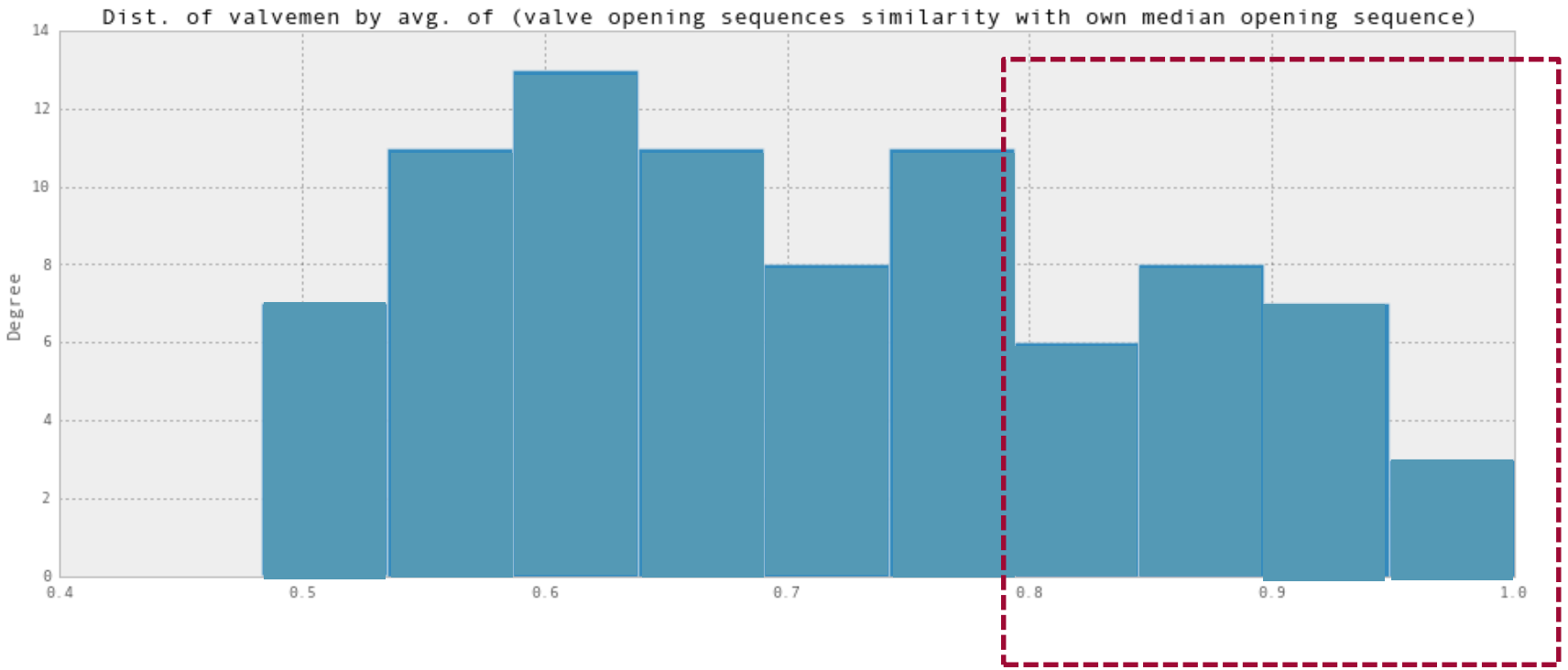
- All opened valves are supposed to be closed and **valvemen should record all these operations**
- Such data is **more interesting for the water utility than** for the end-users

Comparing with the median is the selected option as it provides the best predictability for end-users

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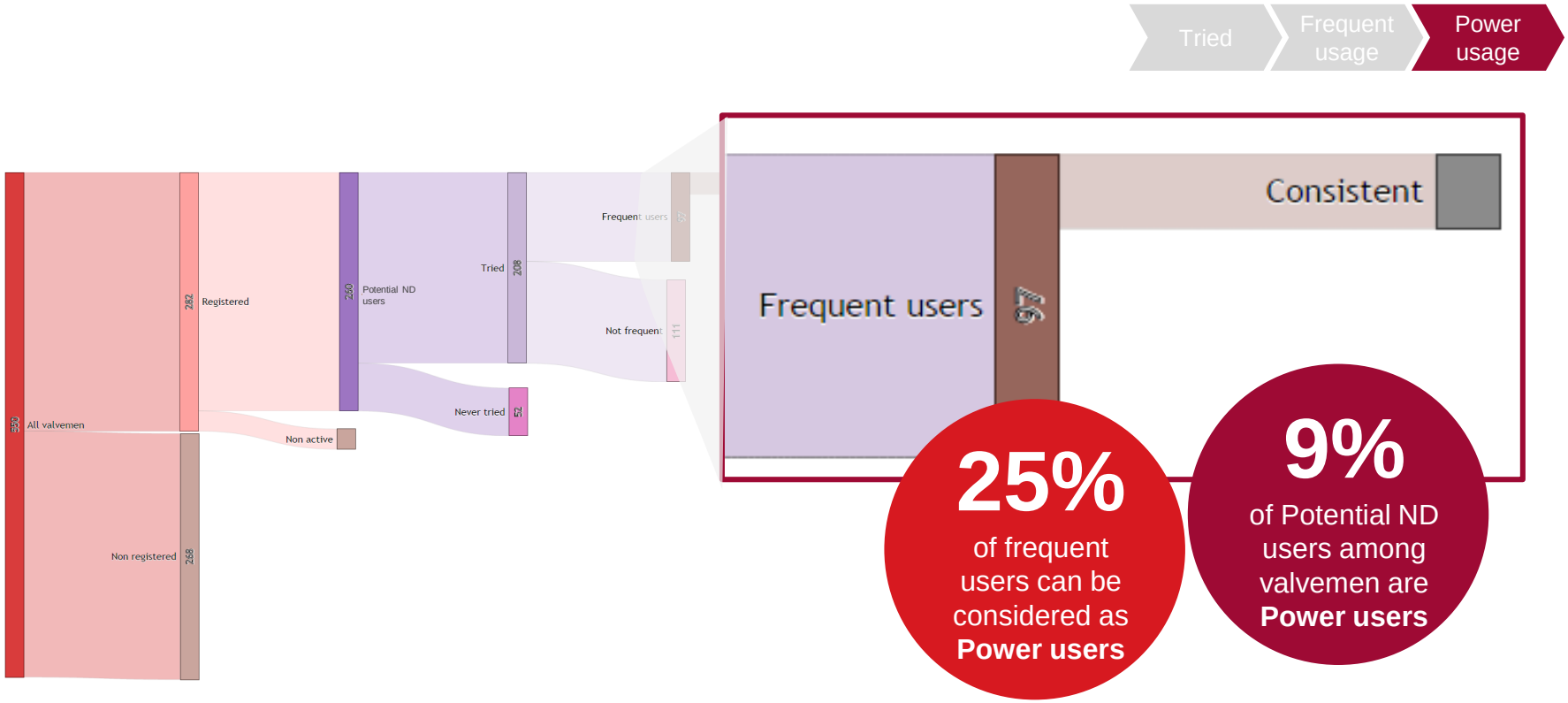
Valvemen with a similarity to their median >= 0.8 are considered consistent

Tried | Frequent usage | Power usage



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The share of valvemen who are Power users is marginal

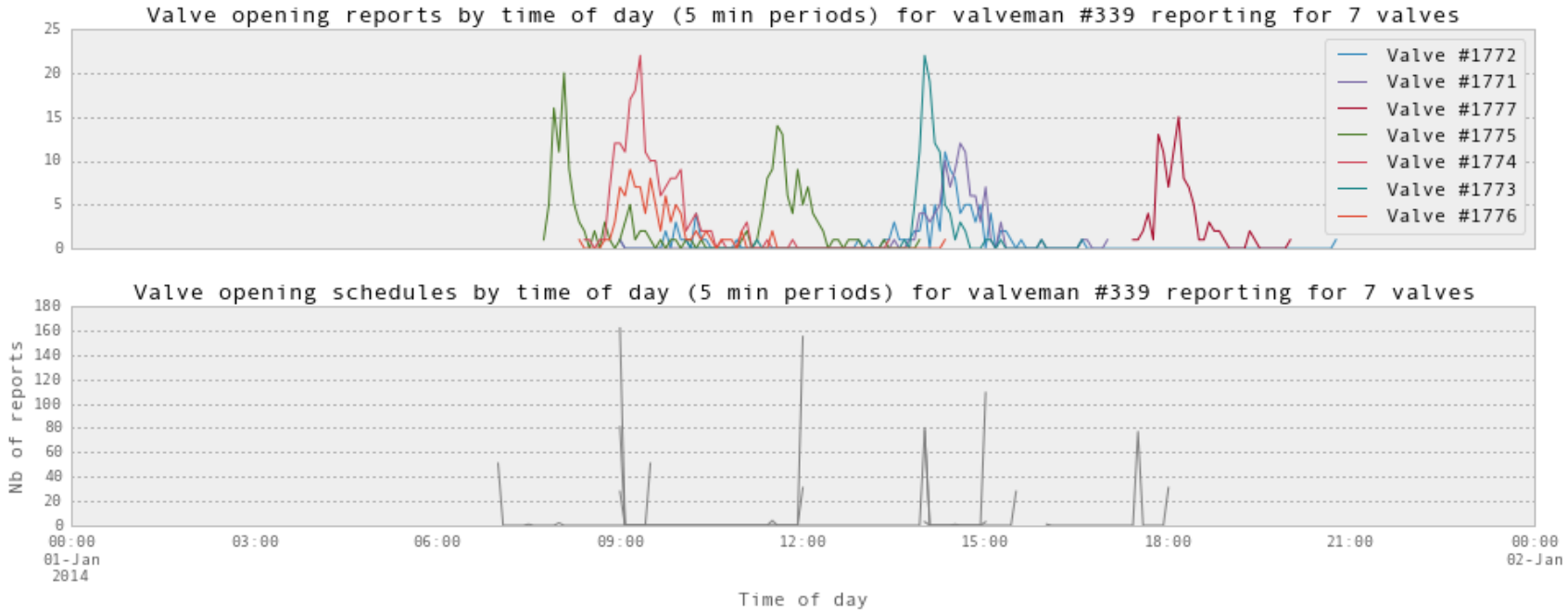


- This part of the **journey** is the **trickiest** since the split is based on a score on a ratio rather than a binary action
- However, such an **approach** can prove **fruitful** for NextDrop to better track **valvemen's behaviour**

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The analysis could be automated at the valve level

Tried | Frequent usage | Power usage



- An in-depth analysis at the **valve level**, **comparing** the **opening times** with the **schedule** would help the water utility **identified gaps** or **issues in the schedule** as well as **valvemen with erratic behaviour**
- BWSSB should considered **providing incentives** to the **best performing** valvemen

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While the benefits are clear, the service is still impractical

- Valvemen who use ND **clearly see the benefits**
  - To **protect them** from the public's complaints and **harassment** (free time for them)
  - To increase customers' satisfaction (by informing people)
  - **To help them to identify problems** (from being notified by NextDrop based on users' feedback)

"Now I don't have to listen to the complaints all day I can focus on my job" – Valveman, ND user

"I have 74 valves – if I have to call 148 times a day, when will I do my work?" – Valveman, ND user

- The **IVR is too time consuming** to use and disruptive of their routine
  - Logging opening and closing for every valve (e.g. 50-70) is **repetitive** and **feels unnecessary**
  - The IVR introduction is **too long** and they often have to re-enter valve codes

"When I am using my tools and going between my valves I need to focus on the work and don't want to be using my phone" – Valveman, ND user

- Therefore, valvemen **log their valves in batches**
  - For instance they do so for a group of 10 valve when they have time
  - Since they log the opening later, the data is **less accurate**



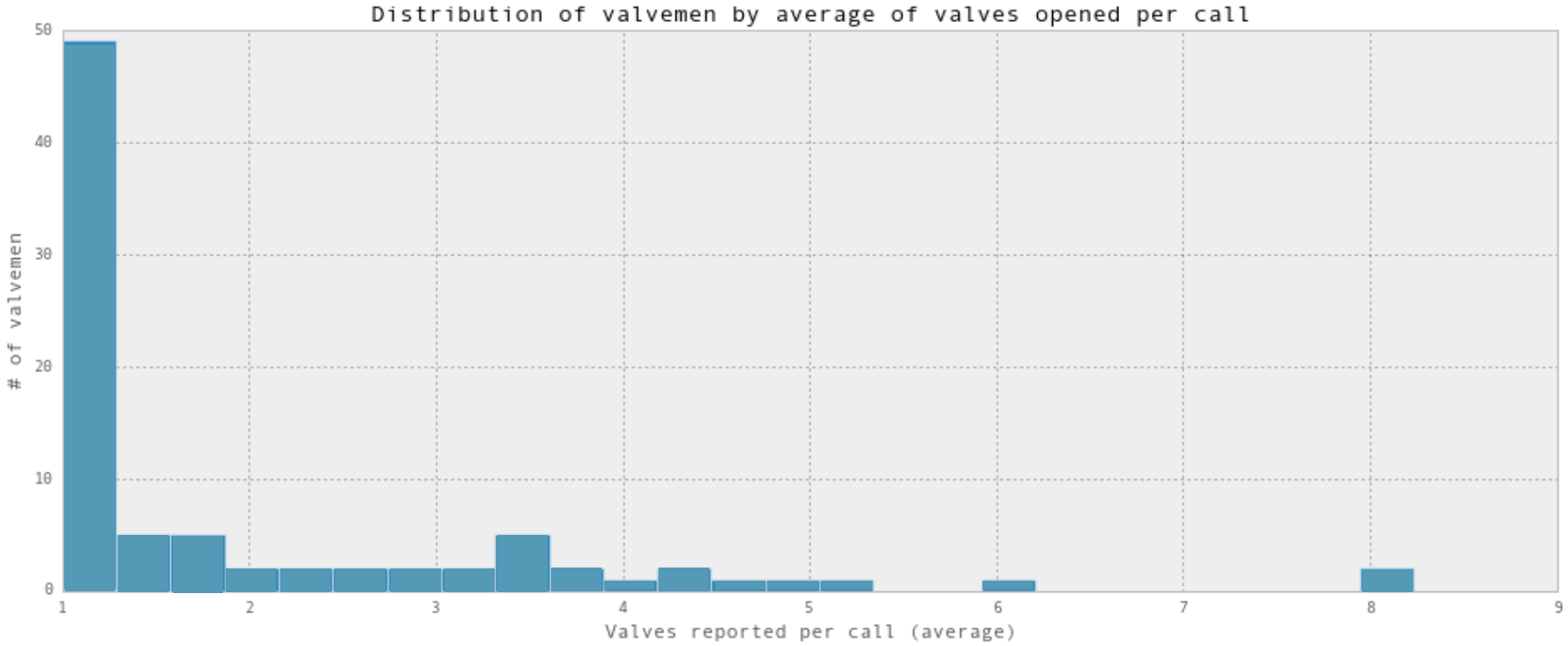


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Reporting valves in batches is common

1.82

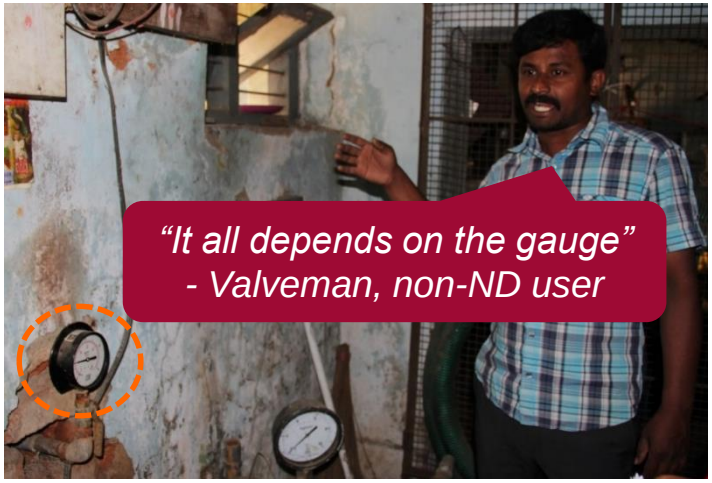
- The average number of valves opened per call to the IVR
  - **NextDrop offers the possibility to record several openings per batch**
  - This more practical for valvemen but impacts the accuracy of information to the end-users
- Valvemen not **recording all their valves** is actually more a **larger concern**



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IVR system has flaws and the app raises concerns

- NextDrop does **not factor in water pressure:**
  - The **water** is **dependent** on the reading on the **gauge** which sits in a small office building
  - The **valvemen check** this in the **morning** before starting their shifts
  - Could be a key reason why people are receiving the message from NextDrop but not receiving water
  - Other dimensions, such as the **slope** in the area, should also be considered



- Valvemen would **prefer to report issues**:
  - The **schedule** is supposed to be the **same everyday** so focusing on a breach in the schedule would be more relevant

"The water always comes at the same time so we only need to tell them when there is a problem" – Valveman, non-ND user

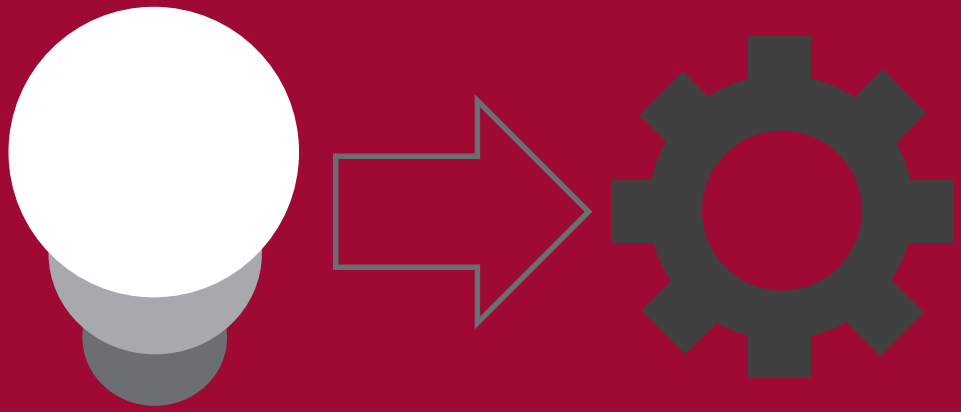
- Valvemen are **reluctant to use the app**:
  - Worries about the **phone** getting **stolen** or **damaged**
  - Using a piece of high-tech equipment **doesn't feel intuitive,** esp. as it is often muddy / raining

"I don't want them to give me one of those smartphones – it will get stolen"
– Valveman, ND user

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Recommendations:

3 ways forward along a range of recommendation areas for the service



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We see three kinds of emphasis for NextDrop

Deeper utility engagement & city iteration

Short/medium term

Allow greater depth of engagement and product development in a focus city (e.g. Bangalore) to provide the proof points to replicate iteratively across other cities, partnering with water utilities:

- Determine & prioritize **1-2 key value propositions** for the water utility
- Ensure **sufficient quality of data (**valvemen reporting accuracy/ customer feedback) to deliver on utility value proposition
- Build **systems to scale** across new cities iteratively

Drive rapid breadth & scale across users /partners

Short/medium term

Focus on scaling across new cities and new types of B2B revenue sources (e.g. Utility, FMCG, etc.) as fast as possible:

- Build **user numbers as quickly as possible**
- **Prioritise removing barriers to signing up** new users at scale
- Diversify across B2B revenue streams, **without investing heavily** in any one area

In practice these two approaches are likely to be combined

Automation & Infrastructure future focus

Medium/long term

Aim to become turnkey provider with blended automation, infrastructure and software value proposition to the water utility:

- Look to **insert 'irreplaceable' infrastructure** into the water network and analysis at optimum cost & speed
- **Reduce dependence on human actors** (e.g. valvemen) while maintaining strong end customer/ water utility value propositions
- Partner strategically to **become turnkey provider**

Which represents the most logical emphasis for NextDrop to grow

?

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These directions hinge variably upon five core recommendation areas



Reframe brand & customer value proposition

At present the end user value proposition is at risk of not being delivered due to accuracy issues & brand misunderstanding

Reframe the brand and customer value proposition optimally to drive valuable data from customers & allow NextDrop time for accuracy improvements



Create scalable registration process

At present registration is complicated and creates significant human cost for NextDrop via manual procedures

Reduce the level of complexity and automate procedures (especially around capturing customer location) wherever possible



Review valvemen incentives

A range of valvemen incentives has been explored historically, but it is still not clear what incentives are optimal

Review the existing incentives for valvemen & evidence from qualitative research to design optimum approach for future



Improve accuracy of core product

NextDrop's delivery of accurate water timing information depends upon obtaining high enough quality data

Assess existing barriers to obtaining data of sufficient quality and address, as well as explore new solutions to overcome barriers



Explore automation features in network

An apps & SaaS model is highly displaceable, inserting intelligent infrastructure into network is more defensible

Explore possibilities and partnerships for inserting infrastructure into the network creating a turnkey IoT model

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*Saas = Software as a Service, IoT = Internet of Things

End user value proposition is at risk but could be reframed

B

At present, end users see two distinct value propositions for the NextDrop service which are hard to deliver on

Water supply timing

Service complaint mechanism

"I have been using it for 6months and it has only ever been correct twice" – power user, female

"Always the day is correct so it will remind us that water is coming that day" – regular user, female

Not giving accurate information but provides reassurance

"They listen, but the problem is they don't take action – they cant actually solve the problem" – Power user, male

Provides an outlet for customers to express their concerns but become disillusioned when NextDrop can't resolve their issues

Can make clear that improvements in the quality of the information is driven by data that users share



NextDrop users appear to have patience with the service despite the high expectations/needs in relation to the two value propositions.

This buy-in can be used by NextDrop to reposition part of the service function more explicitly around a 'improving the water supply timings over time' if the customer understands that:

- Water supply timing may not be accurate now
- But providing feedback helps improve the chance of accuracy in future

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Opportunity to reframe the service that drives more engagement

B

Help us help you!

The problem….

We are unable to give you accurate water supply at present, because of the challenging situation…

What you can do...

But if you enroll in ‘citizen water reporting’ you can help us improve timings

How we can help…

We’ll send you water supply timings

You can tell us whether it’s correct

We’ll use your feedback to improve everyone’s understanding of water in the city

The basis of a new branding strategy?

“Help us help you” could be the basis of a new customer proposition, de-emphasizing water supply timing, and highlighting the need and value of crowd sourced citizen information

Framing the 300k licenses with BWSSB…

“Help us help you” could be the basis of how to frame the end user licences sold to BWSSB, where the solicited customer feedback is positioned as a means to “improve the water situation” in Bangalore

Could be cobranded as a BWSSB & NextDrop initiative

Ideas

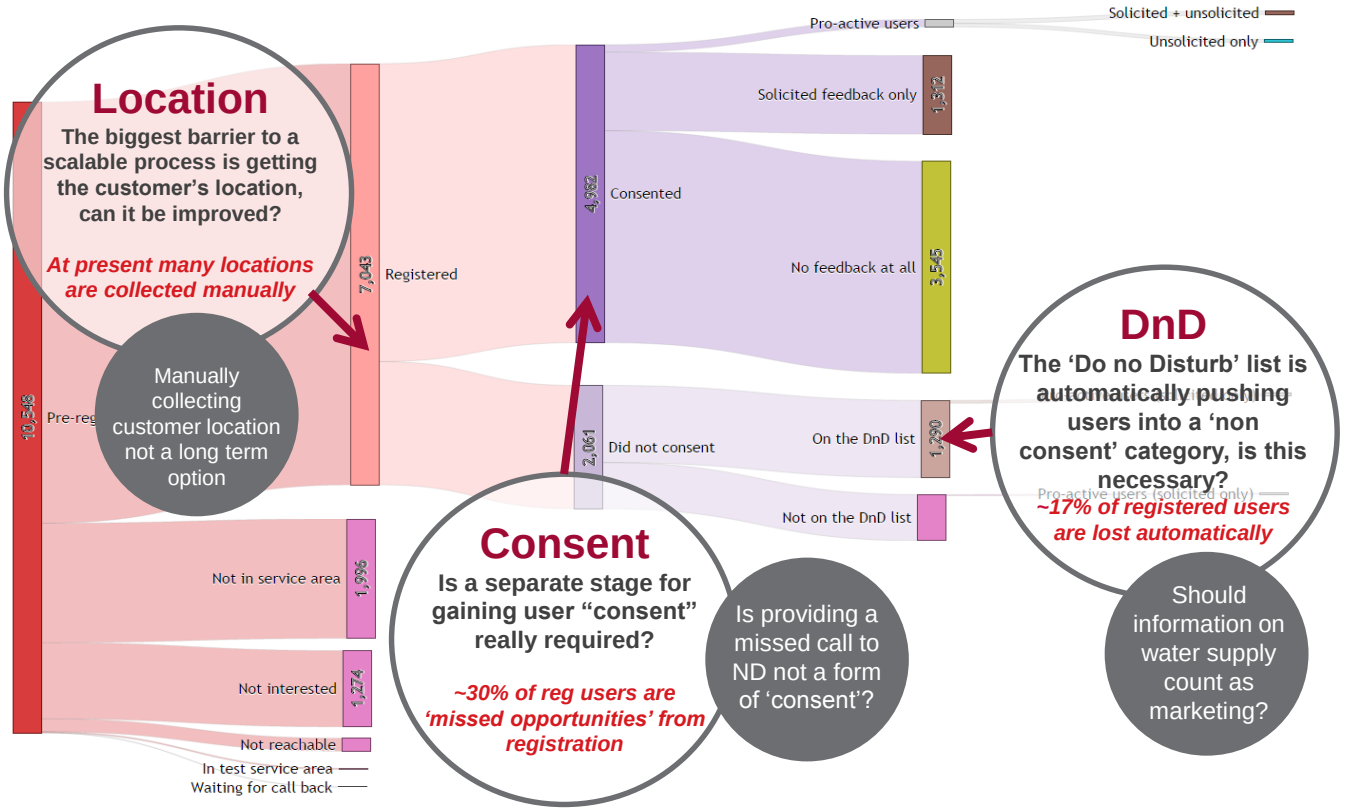
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There are 3 key issues with the current registration process

R

There are three key components to address in the procedure

- A customer's must currently **pass 3 stages** (pre-registration, registration, & consent) to become fully registered and able to provide unsolicited feedback – **this is too complex**
- We identify **3 key components that hinder registration** for new customers and can be targeted to make improvements to address this over complexity



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The smartphone app may not be sufficient to incentivise valvemen

V

To get quality data from valvemen conditions for both valvemen and NextDrop must be optimal

We summarise the situation by sketching four key conditions that the system has to meet for both valvemen (V1 – V4) and NextDrop (N1 – N4)

V1 Must **fit with the routine** – i.e., not take too much time

V2 Must **be practical** – i.e. not risk damage during mucky work

V3 Must be **risk free** – i.e. not expose them as targets for abuse/ theft

V4 Must help '**deflect customer complaints**– i.e reduce # of complaints

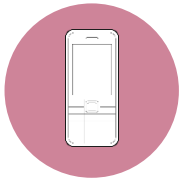
N1 Must get data in **close to real time**

N2 Must get **accurate close/open** valve info

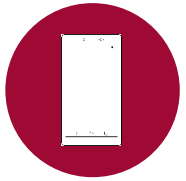
N3 Must get data **linked to correct valve ID and valveman ID**

N4 **extra data** on water issues (pressure, pipe damage, etc.)

Assessing the new smartphone app, there is a concern that valvemen come off worse



Versus



Value	Rating *3=best*	Comment
V1	1	Too long to log valves
V2	3	Can use existing phone, & log valves later
V3	2-3	Generally felt to be low risk
V4	2	ND system generally felt to deflect customer complaints
N1	1-2	Valve logging occurring at different time to actual
N2	1-2	High potential for errors in valvemen entry scenario
N3	1-2	Potential for errors in valvemen entry scenario
N4	1-2	IVR system not as for logging complex info

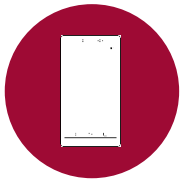
Value	Rating *3=best*	Comment
V1	2-3	Much better fit with routine, attached to valvekey
V2	1	Perceived high risk of damage to phone
V3	1	Perceived high risk of theft/ unwanted attention
V4	2	ND system generally felt to deflect customer complaints
N1	2-3	Assuming valvemen don't cheat system, it's real time
N2	3	Use of app makes open close clear
N3	2-3	Depends on manual entry, but lower risk than IVR
N4	2-3	Easier to log a range of issues on app

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Key conditions for data accuracy requirements

Actions can be explored to increase the incentive for valvemen

V



Smartphone app is better for NextDrop as it generates higher quality data

- ✓ **N1 – N3** much improved on this system (if used correctly)

…How can NextDrop make changes to improve against valvemen conditions?

V1 Must **fit with the routine** – i.e., not take too much time

- ✓ Show them that it will eventually help them to **save time**
- ✓ Ensure they **have sufficient data & battery to use** and mitigate against scenarios in which these are depleted (e.g. provide top-ups at beginning of routine, limit data use, instruct on phone charging practices)

V2 Must **be practical** – i.e. not risk damage during mucky work of valveman

- ✓ Provide a **protective hull** with the smartphone to avoid it being damaged
- ✓ Conduct **user testing in 'mucky environments'** with valvemen

V3 Must be **risk free** – i.e. not expose them as targets for abuse/ phone theft

- ✓ Have phone **heavily branded** to reduce risk of stealing
- ✓ Create casing to **conceal phone** in everyday use as much as possible

V4 Must help '**deflect customer complaints**– i.e. reduce # of complaints

- ✓ **Direct users calling them to NextDrop** (e.g. an automatic message sent to those calling them) so as to reduce harassment
- ✓ **Consider social incentives** (e.g. valveman of the month highlighted on BWSSB website and by SMS to the residents of the area)

Extra Reduce risks that valvemen:

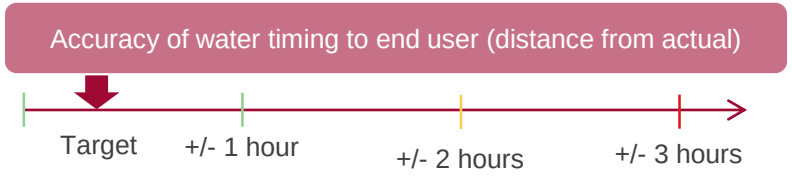
- 'Feel **monitored**'
- Are **uneducated** on the app
- See no **financial incentive** for them (direct or indirect)

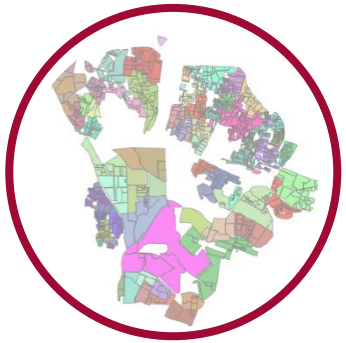
- ✓ **Focus on reporting issues** (e.g. leakage, low pressure, etc.) **on the app** (this could be done in a user friendly way) rather than their routine – reduce concern from valvemen that they are 'being monitored'
- ✓ Provide them with a very visual **plasticized leaflet explaining** the key features of the app
- ✓ Check with the utility on the possibilities of **financial incentives** (esp. since the need for water inspector is reduced)

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Core product accuracy depends on a few critical dimensions

A

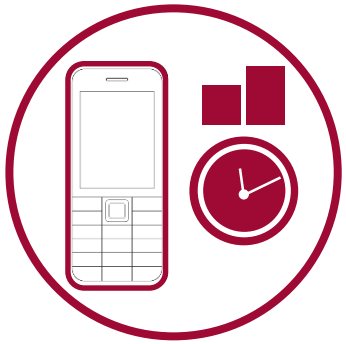




Accuracy of the valve catchment area map

End users fall within the catchment of a given valve, but the exact area boundaries served by each valve are unclear. NextDrop have developed a valuable resource in the form of a better mapping of these valve area boundaries

Increasing the accuracy of this map will improve accuracy of water timing info to end users



Accuracy of reported valvemen open/close actions

Valvemen report when they open or close a valve in the network. The actual time of this event is critical, and different reporting systems create varying degrees of accuracy

Increasing the accuracy of reported open/close times – e.g. +/- 10 minutes accuracy – will improve accuracy of water timing info to end users



Additional factors such as water pressure, slope, etc.

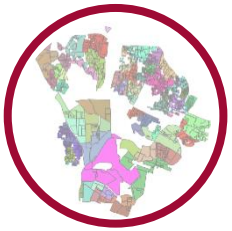
While the first two factors are key, they are not sufficient to provide a totally precise timing to end-users. Relief is stable and data can be collected on this factor, while valvemen have access to the water pressure data

Taking into account other key factors will further improve accuracy of timing and specific key issues in distribution (low pressure, pipes damaged, etc.)

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Existing recommendations & further approaches will support accuracy

A



Accuracy of mapping

Two **existing recommendations** will support the mapping accuracy:

B

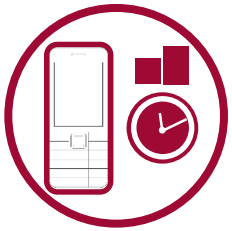
- ✓ **Reframe brand** and outline case for ‘citizen engagement’, which should put the use case of ‘reporting’ top of mind for citizen

R

- ✓ **Reduce barriers to registration & consent** – so that more users can provide the feedback that improves the mapping

There are further approaches that can be taken to improve the mapping:

- ✓ **Calling users on boundary** areas directly to drive solicited feedback on water timing
- ✓ Employ **field staff** to acquire new users on boundaries while also checking water timing accuracy info



Accuracy of open/close data

One **existing recommendation** will support the open/close accuracy:

V

- ✓ **Increase** incentives for valvemen to report open/close data in a timely manner

While further approaches can be taken to build on this:

- ✓ **Additional infrastructure options** – potentially using GPS geofencing around valves and water sensors in network to get water reporting data with reduced dependency on valvemen
- ✓ **Next iteration from smartphone app** – build lower cost/ better fit solution for valvemen + key that removes need for expensive smartphone investment and associated risks discussed by valvemen



Accuracy of other factors

One **existing recommendation** will support the open/close accuracy:

V

- ✓ **Increase** incentives for valvemen to report water pressure and other kind of issue

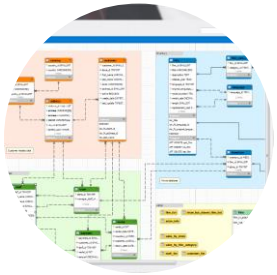
There are further approaches that can be taken to improve the mapping:

- ✓ **Incorporating a map with a very precise relief** in the analysis to better anticipate the likelihood of a specific area to be affected by low water pressure
- ✓ Make it very easy for valvemen **to report issues** (e.g. damaged pipes) that could delay the water distribution delivery

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With accuracy drivers in place, more can be done with the data

A



Embed the planned schedule into the system

- NextDrop has the **planned schedule** from the water utility but it is **incomplete:**
  - Some schedules are not up-to-date
  - All valvemen are not included
  - For some valvemen, only a few dates are available
- Having a precise schedule would allow to make a **relevant analysis of performance and gaps at the valvemen level** (and would remove the need for water inspector)
- **Sending the SMS to users based on the schedule rather than the calls on IVR would probably provide users with more accurate delivery time**



Systematize data analytics

- Many **analyses** can be **standardized** (though a few **changes** in **the way the data is recorded** would be make it easier)
- Designing a **dashboard** to track **KPIs** or results per valvemen would **help identifying issues** early on
- More analyses could be done **per valve** rather than per valveman
- Such an approach would help come up with actionable **recommendations** for **utilities**

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A few changes can be helpfully implemented in the database

A

1 Add data categories to improve comparison criteria

- Create several routine_ids for each valveman from schedule : day#1 = pattern x, day#2 = pattern y
- Create valvemen profiles according to schedule: should be active every single day with same routine, active every single day with different routines, every other day with same routine

2 Systematise sanity checks and improve by iteration

- Between city_area and nd_actualsupply : 177 distinct active Bangalore valvemen associated to 2602 active valves vs 201 distinct active Bangalore valvemen reporting for 2579 valves
- city_id vs home_location : some active Bangalore residents in valid areas are in fact located (lat,long) in the US or South Africa or other places in India
- Process all created users in an invalid area, especially 32 (not in service area) to process them again when the service area is reported open OR when other residents are registered in the service area covered by their location

3 Change the data model carefully

- Do not mix logging activity with actual status records : updates should be done carefully to keep valuable historical information unchanged
- There are more created residents than call_type = 9 (registration) in the customer service entry table

4 Additional issues

- Enforce consistency with datetime objects : store them all in UTC or in local time, but do not mix to avoid errors and selection issues
- Avoid storing unneeded private information like the API key for the smartphone application (JSON response logged in the vk_vkmessagelog table)

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Automated infrastructure appears a logical next step for NextDrop

SaaS models & apps represent a risky strategy

There are low barriers to entry in the software and application development space. While historical data & a larger active user base are early hooks for investors, they can be more easily displaced than physical infrastructure in the network might be (which would be a more attractive longer term proposition):

Possible actions:

- ✓ Analyse the risks of competitors displacing the solution (especially larger organisations with more capital to invest in marketing & distribution)
- ✓ Investigate the opportunities to develop a service solution with technology that could be automated with infrastructure

The aim is to be a 'hard to replace' turnkey provider

A range of technology/mechanical companies already serve the water network (e.g. valve/key makers, water pipe manufacturers, etc.). Partnering with such players would help create a 'turn key' solution for the water utility that would be hard to displace.

Possible actions:

- ✓ Create a hit list of potential technology/mechanical partners who work on the water network
- ✓ Propose partnering models with select providers, with a 'turn key' endgame for utility (e.g. new electronic valvekey)

Intelligent infrastructure appears the optimum solution

By creating solutions which can be embedded in the water network (e.g. sensors on pipes, electronic valvekeys, etc.), which are also 'smart' (meaning they are linked with a larger communication network), a solution can be explored which reduces human dependencies and is more defensible once the utility initially invests.

Possible actions:

- ✓ Explore pilots with new solutions for utilities – likely in partnership with relevant technology/mechanical providers – iterating as fast as possible
- ✓ Explore migration of existing service solution onto 'intelligent infrastructure' solution as soon as possible

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Each strategy will imply a different ordering of recommendations

Deeper utility engagement & city iteration

Order

- V — Review of valvemen incentives
- B — Reframe brand/customer value proposition
- A — Improve accuracy of core product
- R — Create scalable registration process
- I — Explore automation features in network

On this approach the valvemen are key because they represent a ‘hard to monitor field-force’ that provide critical data on which to build value propositions for end users and the water utility. Understanding optimum incentives for valvemen participation is therefore highest priority. Reframing the brand/product is the next necessity to provide a basis to get more customer feedback that can increase accuracy of NextDrop products

Driving rapid breadth & scale across users/partners

Order

- R — Create scalable registration process
- V — Review of valvemen incentives
- B — Reframe brand/customer value proposition
- A — Improve accuracy of core product
- I — Explore automation features in network

If the primary goal is gaining more end users, then the registration process is clearly the earliest priority as this will limit growth. The next priority will be addressing the incentives for valvemen to ensure data can be collected as the basis for delivering a service to these end users. Automation is least likely to be explored on this approach due to resource constraints

Automation & Infrastructure future focus

Order

- I — Explore automation features in network
- R — Create scalable registration process
- B — Reframe brand/customer value proposition
- A — Improve accuracy of core product
- V — Review of valvemen incentives (less relevant)

On this approach earlier investments (R&D + partnering with other technology companies) to determine what the best ‘intelligent infrastructure solution’ will be key. Next will be reducing barriers to registering users. Improving accuracy of the product should be addressed automatically through the new infrastructure solution. This approach could reduce the need for engaging valvemen entirely

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Approaches have key strengths and weaknesses to be considered

Deeper utility engagement & city iteration

- ✓ Offers **ability to focus on key actor, the utility**, whose non-co-operation creates near impossible barrier to entry for NextDrop in exploring new cities/regions
- ✓ **Greater chance to determine optimum turnkey solution** for utility – which may require working with more partners (e.g. valve key manufacturer, CRM solution providers, etc.)

- ◆ **G2P play can be risky** given slow moving nature of water utilities
- ◆ Lack of diversity in revenue sources **can create weak negotiating position** due to over-dependence
- ◆ Over-focus on one player creates **risk of non-replicability** in new iterations

Driving rapid breadth & scale across users/partners

- ✓ Greater scale and users can create **a good conversation starter for potential investors**
- ✓ Greater diversity of explored value propositions **reduces risk of significant sunk costs**
- ✓ Fastest moving model, with greatest chance to **try the most in the shortest time**

- ◆ Risks spreading resources too thin/**may take longer to find replicable service model**
- ◆ Likely **slowest route towards being a 'turn key' solution** for utilities or others
- ◆ **Potential conflict of interest** across models explored (e.g. FMCG branding might make service 'promotional' in eyes of regulator)
- ◆ **Greater management burden**, with concurrent number of relationships and contracts

Automation & Infrastructure future focus

- ✓ These 'infrastructure + intelligence' models are **hardest to displace** – quickly become integrated (physically) into water network
- ✓ This combined tech/infrastructure approach is **attractive to investors** (more than just SaaS)
- ✓ **Reduces human dependence** on valvemen in particular

- ◆ Most significant **change in current focus**, and so may be harder to leverage existing NextDrop assets
- ◆ May require **significant cost** in R&D & then subsequent infrastructure investments
- ◆ Risk in entering **new competitive environment** with existing vendors

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Introducing the M4D Impact Evaluation Service Model

A means of helping and advising organisations to better use their data

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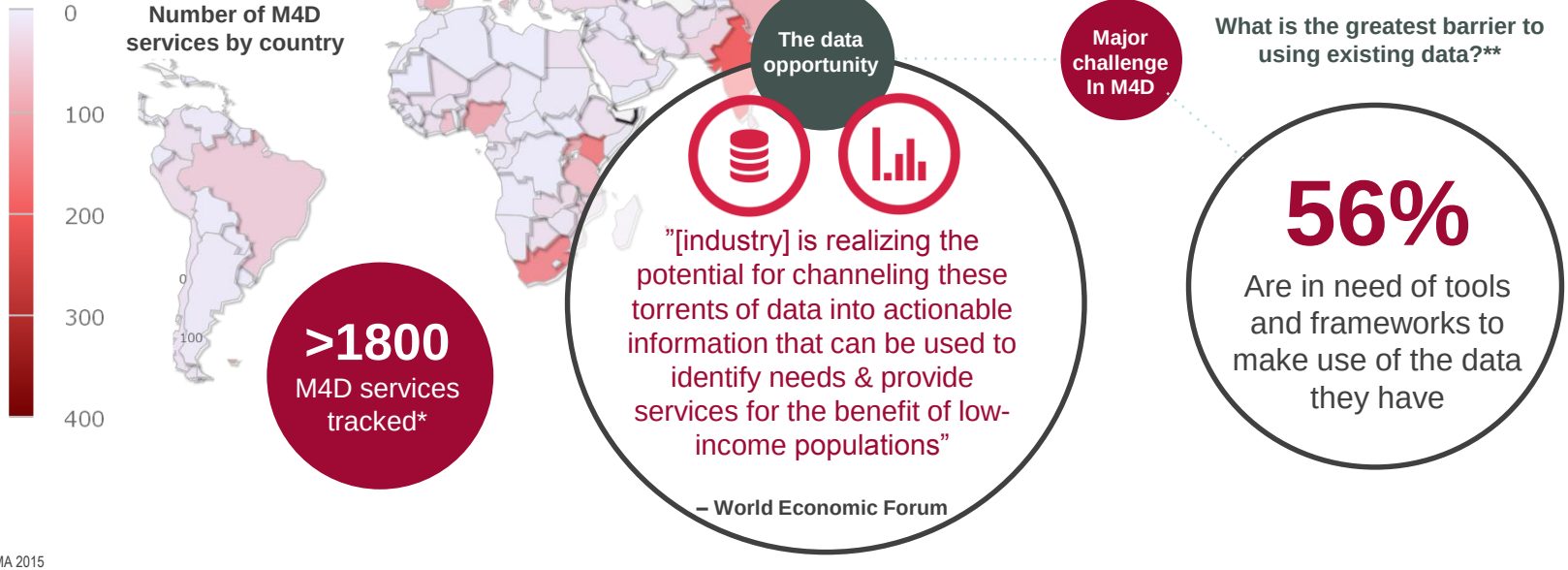
An opportunity & challenge around data in mobile for development

Big Picture – “Big data” touted as game changing in international development, mobile leads the way

- Many refer to the opportunity in “big data” in international development as a means to better serve the interests of underserved populations
- Solutions in the international development space that use mobile technology are of particular interest because of the volume of data they quickly generate - with over **1800** Mobile for Development (M4D) services now tracked by M4D Impact, this opportunity grows every day

A Key Barrier for the Industry – Not data access but data use

- Organisations offering mobile products and services that target underserved populations – from Mobile Network Operators to NGOs – all desire to better use data they already have, with business questions in mind to ensure sustainability, social impact, and scale
- The need for tools and frameworks that allow implementing organisations to make better use of the data they have is striking, with **56%** of respondents from a recent M4D survey citing this need as primary



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Source: (*) M4D Impact product and service trackers (**) M4D Impact survey results – see ‘Making the most of data in M4D’ report

Our approach creates direct impact and shares replicable methods

We work with M4D service providers across sectors

Results from our survey show a need across sectors and organisation types to make better use of existing data*

Provide support to tackle barrier of lack of frameworks and tools

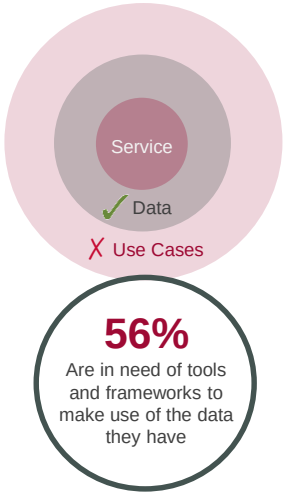
A cost effective service supporting M4D service providers to make use of existing data, focusing on tools and approaches that can be reused would prove valuable for a wide range of organisations

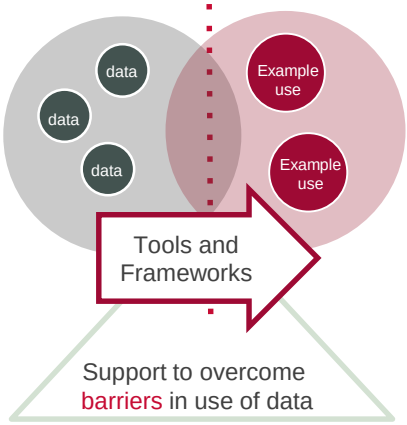
Seek replicable approaches across sectors & organisation types

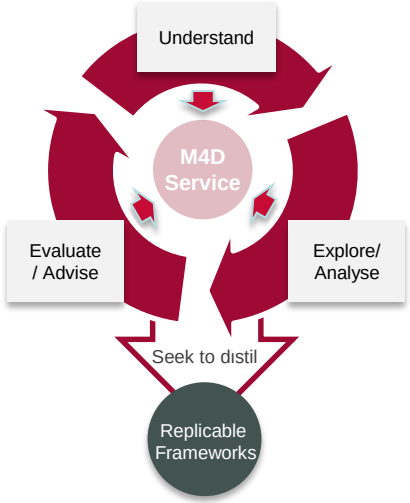
Beginning on a case-by-case basis with given M4D service providers in tackling barriers to data use, we seek to refine replicable frameworks and tools across sectors

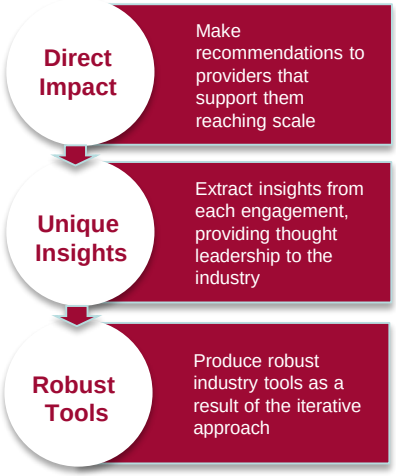
Add value to the wider M4D industry across sectors

Share findings with the wider industry – insights and tools that are relevant and applicable across sectors; both directly and indirectly impacting M4D service providers in supporting them overcome barriers to data use









Source: (*) M4D Impact survey results – see 'Making the most of data in M4D' report

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Note on privacy: It is important that the request for data be in line with regulatory market requirements (e.g. customer location data generally cannot be shared without the customer's consent). For further resources on data privacy go to http://www.gsma.com/publicpolicy/mobile-and-privacy/design-guidelines & http://www.gsma.com/publicpolicy/mobile-and-privacy/mobile-privacy-principles