EVALUATING USER SATISFACTION AND THE IMPACT OF AN APPLICATION-BASED SOLUTION ON ENHANCING WATER SERVICE ACCESSIBILITY AND ACCOUNTABILITY: A CASE STUDY OF THE 1SERVICE APP IN SATKHIRA MUNICIPALITY, BANGLADESH

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ABSTRACT

Bangladesh faces the challenge of providing safe water access to all its citizens while grappling with limited resources and complex hydrogeochemical characteristics in secondary towns. This study focuses on Satkhira Municipality, situated in the southwest coastal region, where growing salinity and iron content make safe drinking water a necessity. While 73% of the population has access to municipal piped water, the effectiveness of water infrastructure is hampered by budget constraints, administrative inefficiencies, and revenue collection issues. Traditionally, monthly water bill payments involved time-consuming manual processes, such as producing and distributing bills, client payments, and data entry. Practical Action introduced the 1service app, a mobile-based utility platform, revolutionizing service delivery, monitoring, and accountability. This research assesses user satisfaction with the 1service app and its impact on municipal water and sanitation departments. Employing a mixed-method strategy, including surveys and key informant interviews, data collection encompassed users and non-users of the 1service app. Results reveal that 68% of the community remains unaware of the app, while 80% of users express satisfaction with its services. Notably, female and elderly residents significantly benefit from this accessible solution The 1service platform streamlines water bill payments, reducing citizens' burdens, costs, and time. Despite high satisfaction rates, barriers to wider adoption include a lack of municipal initiatives, knowledge gaps, lack of digital literacy and technical issues. This system enhances municipal operations, maintains consistent revenue collection, and enables real-time information updates. The study concludes that the 1service system exhibits promise for improving water service delivery in Satkhira Municipality. Continued expansion and engagement efforts, coupled with effective revenue collection, can further enhance this platform's impact.

Keywords: Water Service Delivery, 1service App, user satisfaction, water supply accountability, Satkhira municipality

1. INTRODUCTION

While Bangladesh has progressed on overall improved water coverage over the past few years – access to safe water for all remains a challenge. With the SDGs calling on national governments to strive to Ensure the availability and sustainable management of water and sanitation for all– the situation of safely managed water is a challenge for Bangladesh. According to the Joint Monitoring Programme (JMP) Report of 2022, the proportion of Bangladesh's population with access to safely managed water is 59%. "Satkhira is one of the country's most vulnerable coastal districts, located in disaster-prone areas of Bangladesh. The district is a hotspot for all types of climate-related hazards. and affected by salinity intrusion, tidal inundation, water logging, cyclone and storm surges, drought, and other natural disasters. The floods and prolonged waterlogging have caused a large-scale displacement, posing humanitarian problems for food security, shelter, clean water supplies, and sanitation. The water logging that affects the residents of Satkhira municipality has a detrimental impact on the environment, the economy, society, and people's physical health. Waterlogging has an adverse effect on day-to-day living due to damage to structures and infrastructure, disruptions to traffic and movement, loss of income, and other issues"(Choudhury and Ferdous 2013). Local governments in secondary cities and towns across Bangladesh have resource constraints – financial and human capacity – which limit their ability to provide service delivery for water management. "Satkhira municipality's three water treatment plants, which manage 100 kilometers of piped water network, are the only reliable source of water for city dwellers. Over 112,000 people receive water supplies from Satkhira municipality every day" (Morais and Mottakin, 2020). "The main water sector problems of these cities[1] – which impact both water service providers (WSPs) and the general public – include large off-grid populations, billing and payment inefficiencies, weak physical and institutional infrastructure, and poor water quality coupled with low investments" (Amankwaa, Heeks and Browne, 2021). "The manual method of water service management including water bill collection lacks transparency and a monitoring system, and the municipality failed to accurately collect water bills from city dwellers. Water bills came due in large amounts, and they keep getting bigger every month. As a result, the municipality faced difficulties in managing water service maintenance and operation costs. which results in poor service quality and service interruption" (Water Department, Satkhira Municipality). "The water sector is facing a number of governance challenges where mobile services can make a difference, especially when it comes to increasing transparency, accountability, and participation" (Hellström and Jacobson, 2014).

Also, "The water sector is experiencing a growing need for innovation, with digital water innovations playing a significant role in this regard. Along with the use of data analytics, new technologies, ideas, and techniques for digitizing and "smartening" water systems are being widely adopted to improve the sector" (Amankwaa, Heeks and Browne, 2021). "Mobile-enabled solutions have also empowered municipalities to better understand the challenges they face" (GSMA, 2020).

For the past 6 years Practical Action in Bangladesh has been strengthening the water system management capacity of Satkhira municipality as well as enhancing beneficiaries' accessibility to municipal service through the 1service system from anywhere. "1Service is a cloud-based platform that lets users pay their water bills with any mobile banking agent or their smartphone. It also gives users timely notifications when their bills are due" (Morais and Mottakin, 2020). The platform is an integrated Digital Solution for Water and Waste Management including Web-Based Billing and Mobile App-Based Collection System for the Municipal Water Department. The platform makes it possible for users to request and pay for water services as well as give meaningful comments, check their monthly water bills, and pay them using a mobile application from anywhere in the country, which saves time and money compared to standing in line at the bank. This platform is also useful during natural disasters such as floods, cyclones, and waterlogging when people are unable to travel to municipalities to pay water bills, complain about water connection disruption and sanitation servicing, or experience service disruption. This platform allowed them to obtain these services from the comfort of their own home.

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[1] This refers to countries/cities in the global south that are classified by the World Bank as low- or middle-income and are located in Africa, Asia, Oceania, Latin America and the Caribbean (Wikipedia).

This has resulted in municipalities with an automated system for bill creation and collection, such services also expect to increase the municipality's operating efficiency and, ultimately, its revenue collection, Improving the coverage and financial sustainability of service delivery.

This paper will present an analysis of user satisfaction and the effects of the 1service system on households and the municipality of Satkhira, to gain insight into the performance and sustainability of the platform.

2. METHODOLOGY

The study followed the mixed method strategy to analyze the data, collected from both secondary and primary sources. Primary data were collected from users and non-users (Neighbour of app users) of 1service app. Quantitative and qualitative data were collected using appropriate survey (Semi-structured questionnaire) tools and Key Informant Interviews (KII) as per objectives. All the respondents were selected purposively. Secondary data were collected from the beneficiary's database (1service app users, who paid their water bill using the 1service system) from May 2019 to January 2023. This assessment was conducted in Satkhira municipality, Bangladesh where the app is currently being used

2.1.1 Sampling strategy and technique

The study applied a mixed method comprised of questionnaire survey (semi-structured) tools, Key Informant Interviews (KII) as per objectives, and desk review. All the respondents were selected purposively. A total of 64 individuals were interviewed, comprising 30 users and 34 non-users of the 1service app. The non-user respondents were considered from the neighbours of app users. The KIIs were carried out with many important stakeholders associated with the 1service app including two municipal officials from the water department and three mobile banking agents who usually pay water bills using the 1service app.

Table 1: Sampling Frame

Description	Total	Sathkhira	
		Male	Female
Interview Respondents (App user)	30	25	5
Interview Respondents (App non-user)	34	28	6
KII with local mobile banking agent	3	3	0
KII with Municipal Official	2	2	0

2.1.2 Data collection, aggregation, and analysis

A team of Practical Action consisting of three members with relevant experience carried out the data collection process. For collecting qualitative data, the study team took detailed field notes and summarized them as per the study objectives. Then compiled all the data and information under each theme. The data from the quantitative assessment was cleaned and analysed using MS Excel. Thematic analysis was conducted by providing a brief description of the findings. At the start of the interview, participants were informed about the study purpose, reassured of the confidentiality of information divulged and provided verbal consent to be interviewed. Semi-structured tools (interview questionnaire and KII questionnaire) were applied for the data collection under the study.

3. ILLUSTRATION

3.1 Status of 1Service app uses to pay the water bill

Sathkhira municipality has a total area of 31.10 square km, and the population is around 1,82,000 of which 73% have municipal piped water facilities/connections. It is estimated that by each water connection, 11 people are being benefited from access to municipal piped water (Municipality data source). In general, a traditional method had been used to pay the monthly water bill. It comprises manually producing and distributing the bill, having clients pay it in a bank or to the municipality, collecting bank statements, and entering them into the database of the municipality. These procedures all took around 20 days. Since the launch of the 1service platform in May 2019, the estimated time has decreased dramatically. In total, till January 2023, 10,800 water bill payment has been made through 1Service platform. The table reflects year-wise water bill payment status.

Table 1: Year-wise water bill payment status using the 1Service app.

Municipality	2019	2020	2021	2022	2023 (25 Jan 23)
Satkhira	3105	35	3954	3642	64

3.2 Knowledge and Attitude on 1service app among city dwellers

In the survey, neighbors of app users who don't use the 1Service app were interviewed to determine how well-known the app is in the community at large. Only 32% of the community members who participated in this study had heard of the app, while 68% were unaware that they could use the 1Service app to make their municipal water bill payments from home. The reasons why certain number of community people who were informed about the app did not use them were examined as well. Being unable to manage the app was the primary factor cited for not using the 1service app, even if internet connectivity is always necessary to use the app. Another reason for not using the 1service app was the lack of a smartphone. It was suggested during the KII with municipal water department representatives and mobile banking agents that increasing the number of agents used to pay water bills through the 1service app could be a good idea to increase the number of 1service app users for paying water bills like the electricity bill payment system.

Table 2: Awareness on 1service app

Awareness on 1service app among the city dwellers	Response	
	n	%
Know about 1service app	23	68%
Don't know about 1 service app	11	32%

Through the study, it was revealed that 91% of respondents among 34 non-user respondents were interested in using this type of service. They claimed that the 1Service system was time-efficient during the interview since it enables customers to access water bill payment services from the comfort of their own homes. They can save time on travel costs and convenience. People who live elsewhere but own a home in Satkhira can also benefit greatly from the 1Service system. Only 9% of the respondents were happy with the current mechanism for water bill payment and were not interested in using the 1service app.

3.2.1 Reasons behind less interest of using 1service app

The study additionally took a look at how positively people felt regarding the 1service app, even though very few people use it to pay their water bills. Numerous factors were found to be the primary contributors to the app's low usage during the survey.
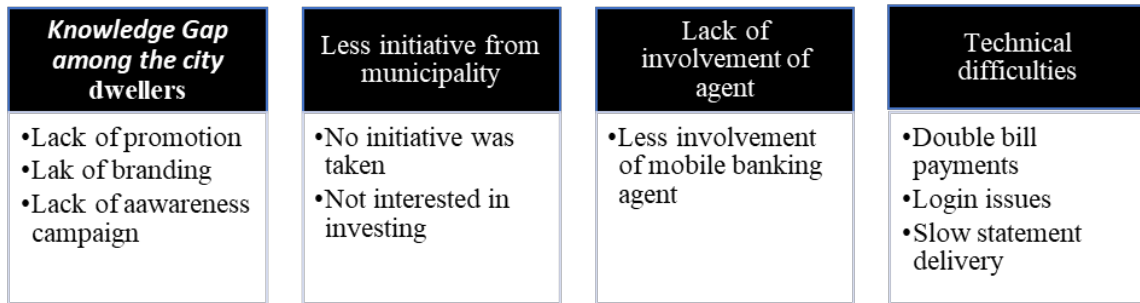
Knowledge Gap among the city dwellers	Less initiative from municipality	Lack of involvement of agent	Technical difficulties
•Lack of promotion •Lak of branding •Lack of aawareness campaign	•No initiative was taken •Not interested in investing	•Less involvement of mobile banking agent	•Double bill payments •Login issues •Slow statement delivery

Figure 1: Contributors to the app's low usage

Knowledge gap among city dwellers: There had been a massive push to advertise the app during the development of 1Service system. Following that, no action was taken to promote the app. Among those who do not use the app, only 32% are aware of it. The 1service app cannot be as widely used as possible without effective awareness raising. Once customers learned how to use the product, they gradually started showing interest in switching towards technology-based solutions.

Technical difficulties: The study explored that user of the 1 service app faced some technical issues such as login issues, double bill payments, slow statement delivery, etc. while using the app. However, they didn't get a solution for these issues, which is another major reason for not using the app.

Lack of initiative from municipality: The study examined the lack of initiative made by the municipality to promote the app as one of the main reasons people weren't utilizing the app. It was discovered during the KII that the Satkhira Municipality's water department was operating at a deficit due to low tariff rates and a lack of resources. They, therefore, focused less on the 1service app and more on increasing the revenue for the water agency. The municipality's use of the 1service app also encountered a few technical problems. The 1Service app sometimes paid the bill, but for technical reasons, they never got the money. These factors made the municipality less interested in concentrating on 1service app.

Lack of involvement of agents: In the field survey, it was discovered that customers preferred using mobile banking agents to pay their utility bills, even though mobile banking agents are essential for doing so. However, only a small number of mobile banking agents were involved in and instructed to pay water bills via the 1service app during the system's first introduction. Additionally, the agents did not receive the kind of assistance necessary for the app to run smoothly. The agents (KII with agents) closed the service as a result. Officials who participated in the KII from the municipality's water department also emphasized the important role of having mobile banking agents for spreading the 1service system among the customers.

3.3   User Satisfaction using 1service app

Out of 30 respondents who paid their water bills using the 1Service app, 47% of the respondents expressed a higher level of satisfaction with the process. They don't have any complaints regarding the 1service app. Although 23% and 10% of the respondents reported technical difficulties when utilizing the 1service system, they were still happy. The survey found that there are several advantages to utilizing 1Service to pay water bills, including flexibility in timing, convenience, cost-effectiveness, etc.

On the contrary, 20% of users were dissatisfied because of technical issues they encountered, such as login issues, double bill payments, slow statement delivery, etc. However, they continue to use the 1service app to pay their water bill.

Table 1: Satisfaction level of 1Service app user

Level of Satisfaction	Response	
	n	%
Highly Satisfied	14	47%
Somewhat Satisfied	7	23%
Satisfied	3	10%
Dissatisfied	6	20%
Total	30	100%

The 1Service system has saved respondents' efforts in paying their water bills, according to 100% of respondents (30) who used the 1Service app. People can pay their bills whenever it's convenient for them using this platform instead of physically going to the authorized banks or municipalities and waiting in line. The launch of 1Service has allowed people to pay their water bills more quickly. Because they no longer must travel to the bank or municipalities and wait in line, users believe that paying their bills through 1Service saves them time.

3.3.1 Female, elderly, and disabled members can access pay bills through 1service app:

Another reason for user satisfaction is the opportunity for female, elderly, and disabled members to pay bills through the 1service app at any time. Since the service was introduced, the majority of the family's female members have taken on the responsibility of paying the bill due to the fact they can do it while at home in just a couple of minutes. Additionally, the application allows elderly and disabled persons to pay their bills from home. Of all the respondents, 73% said that their family members who are female, elderly, or disabled can use the app to pay their water bills. Their lives have been made easier by this system, especially those who have jobs and run businesses and cannot take time out of their busy schedules to go to the bank and wait in line. They are pleased that Satkhira Municipality has taken this initiative.

3.3.2 Contribution of the 1service app to improving the access to municipalities' services:

The study explored that, access to municipal water services was improved and became more effective for users of the 1service platform. Users have access to their monthly water bill at any time and can pay it in ways that are more affordable, secure, and practical than the alternatives now available. People's lives have become easier because they may pay their water bills without having to wait in a large line. Users formerly had to plan to pay their bills by the due date. For individuals who lived far from the municipality, which required more time and money, this was usually more challenging. Employees used to manage time during the office to settle the bill. Most people choose to pay their bills every three to four months or more to avoid this hassle. The 1Service platform is available around the clock, allowing bills to be paid anywhere in Bangladesh at any time. This has improved the convenience and effectiveness of the bill-paying process.

Figure 2: Difficulties people face in paying bills with manual method.

The illustration depicts the challenges that people encounter when attempting to pay their water bills. The major issues people experienced were having to pay a bill during working hours (57%), which was extremely time-consuming (36%) since they had to physically go to the bank or the municipality. For paying the bill, they had no other choice. With the use of the 1service system, these challenges can be eliminated with other improved access to municipal services.

3.4   Contribution of the 1service app on enhancing the municipalities' monitoring and accountability system

The water department's operating capacities had improved because of the use of the 1service app, and the municipalities' water revenue collection had been constant (Only app users), leading to cost-effectiveness (Source: KII with water department). Municipalities used a traditional method for collecting water bills prior to the launch of the 1service platform. It took a significant amount of time and human resources to generate the bill, collect the bill from the bank, and reconcile the bill. In the past, physically visiting a bank was the only way to make a payment. After payment, the municipality would collect the bank statements and input them into the municipality database, which required a significant amount of time and human involvement. Through the 1service app municipalities can process these activities within a very short time and with minimum involvement of human resources. In the following ways, the 1service app enhances the municipalities' water and sanitation department's monitoring and accountability system.

3.4.1   Enhance efficiency in the billing system

According to the study, this application improved the efficiency of the municipalities' water departments' billing system. With means of this application, the Municipality is constantly updated with real-time information. Previously, they had to generate paper bills, distribute them to consumers, gather bank statements from banks showing which invoices had been paid, and then manually upload those statements into databases. It took a lot of time and effort to obtain a paper bill to pay for the upcoming month.

3.4.2   Cost effectiveness

The study revealed that after the launching of 1service platform, the respective municipalities have started experiencing improved cost-effectiveness of their operations related to billing system. Previously, employees in the water department would work overtime for data entry, bill reconciliation, bill sorting, etc. without added benefits and compromising operational support for the water supply system in the municipalities. Since the implementation of 1service, there has been a decrease in man-days required for the entire water billing process. This helps in maintaining dedicated work hours for the personnel involved. With greater uptake of 1service platform, we can expect that there will be further improvement of cost-effectiveness in the provision of utility services by the municipalities.

3.4.3   Monitoring of bill payments by customers

According to the study, the monitoring methods used by the water departments became more effective because of this application. The municipality can obtain information about the clients who haven't paid their bills and take appropriate action by using this program, which provides real-time information that is updated regularly.

3.4.4   Complain Mechanism

This application improved the municipality's capacity to address complaints about the water and sanitation services it offers. Through this method, consumers can directly report any service issues to the municipality, which will be visible in the municipality's admin panel. And the municipality can respond right away. Even though there were few complaints, they were practically non-existent because customers preferred to call the appropriate departments from their mobile phones to share their complaints and provide feedback (KII and secondary data analysis).

3.4.5   Reducing Human Error in billing system

During the Key Informant Interview (KII) with the Satkhira municipality's water department representative, it was discovered that, for bills paid through the 1service system, bill operators no longer have to manually complete the bills, and the likelihood of human error has decreased dramatically. He emphasized the pressing need to sign up more users for this platform while outlining all its advantages. He underlined the need to hold additional events to spread awareness of this app among city dwellers.

3.5   Discussion and Recommendations

3.5.1   Discussion

The 1service system is promising, even though there is still ample opportunity for expansion in terms of performance and sustainability for effective management, monitoring, and ensuring accessibility to safe water service delivery across Satkhira Municipality.

The study's insights and learning from prior iterations' experiences - utilizing and repeating the strengths and lessons acquired, while attempting to avoid previously committed errors.

Analysis reveals that the municipality's participation and active engagement are very significant for the effectiveness and long-term viability of the 1service system, emphasizing the need for demonstration and awareness-raising in cooperation with ward counsellors and local community leaders. With consistent revenue collection, Satkhira Municipality is better equipped to run its water delivery service systems.

3.5.2   Recommendation

- Capacity building of the municipality for the operation, maintenance, and human resources as well as developing an integrated plan regarding the 1service system is a must to ensure the acceptability of the 1service system.
- Massive communication strategies are to be undertaken to increase the awareness among people on the 1service system.
- Demonstration and awareness sessions need to be conducted in collaboration with ward counsellors and community leaders in the respective area to make the app popular among the communities.
- Satkhira Municipality should develop a long-term plan for 1service system instead of a project-based plan.
- It is needed to work with a diverse group like Mobile banking agents. More mobile banking agents should be involved in the service system.
- Can introduce a hotline number to respond to customer queries and solve customer problems.
- Integrate other municipal services like holding tax payments.
- Technical issues like- login issues, double bill payments, slow statement delivery, etc. should be solved as earliest possible.
- Need to sign a long-term contract with the technical service provider and/or recruit technical experts for continuous support to the municipality in terms of the smooth functioning of 1service app.

4. CONCLUTION

The Satkhira municipality's system for delivering services is being improved via the 1service system. Many users are quite satisfied with the service, according to the research, and there is a big chance to fully popularize the 1service system for paying water bills and incorporating other municipal services like holding tax. The continual improvement and scaling of the 1service system are necessary to

improve Satkhira Municipality's service delivery system. Comprehensive research would have been useful for capturing the role played by the 1Service platform in the Satkhira municipality's people's increased access to water and sanitation services as well as the benefits they received.

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