Social Accountability for Mozambique: an Experience Report from the Moamba District

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Abstract. Empowering citizens in making Governments more accountable and transparent in the services they provide has gained more attention in the last few years both in the developing and in the developed world. At the basis of any such exercise, information and data collection activities play an important role. In this paper we report on a pilot we conducted in collaboration with the Ministry of Education of Mozambique, the World Bank and the Maputo Living Lab to collect data about various procurement indicators of primary schools in the Moamba district of Mozambique. For this purpose we developed a data collection platform and a mobile application to conduct field work.

1 Introduction

Citizen involvement is critical for enhancing democratic governance, improving service delivery, and fostering empowerment. For these reasons many actors, among which the World Bank (see, e.g., [1]), have started or are starting initiatives to empower citizens in making their Governments more accountable and transparent.

Such empowerment, however, can be exercised if an adequate level of awareness and know-how are shared with and by the citizens. This includes not only information about a specific situation or the current status of things in a specific sector (like, e.g., the status of schools in a rural area), but also know-how about the chain of responsibility and accountability.

This paper reports on a pilot we conducted in the region of Moamba (Mozambique) in June 2012 about primary schools in the region. The pilot, sponsored by the World Bank and aided by a platform – called SAMo, Social Accountability for Mozambique – we developed for the project, involved 677 citizens who commented on various procurement indicators meant to measure the efficacy of specific interventions in the region. Our contribution includes an updated report on the status of various schools in the region, some technical consideration about platforms for crowdsourcing data, and some initial steps to better understand the process of social accountability.

This paper is organized as follows. In Section 2, we describe similar tools to collect data and promote social accountability. Section 3 describes physical and logical architecture of our solution. The pilot design and methodology used in the assessment are presented in Section 4. Section 5 discusses the major findings of the pilot study. Finally, Section 6 concludes the paper by highlighting future directions.

2 Related Work

Several ICT tools for collecting data in resource constrained regions and for social accountability have been developed in the recent years. Different organizations tackled the challenge of collecting data using mobile devices, including low-end mobile phones with only SMS and phone capabilities, in order to manage emergency situations. In this section we review the most relevant ones with respect to our platform.

The most popular technological tools to collect and deliver information in developing regions are doubtlessly SMS and PDA/smartphone based applications. We excluded voice-based solutions from our review because we rely on volunteers who interview directly the members of the target community. We evaluated existing tools starting from the requirements of direct interaction and openness of the data collects.

Among SMS based solutions, FrontlineSMS and RapidSMS [2] are the most complete and customizable solutions for our usage scenario. They are both free and open source frameworks for dynamic data collection, logistics coordination and communication via SMS. They have been adopted in a wide variety of scenarios such as remote health diagnostics, nutrition surveillance, supply chain tracking, registering children in public health campaigns, and community discussion. By being designed to work over an existing infrastructure, these SMS based solution present no particular cost for new equipment and have very limited bandwidth costs. However, in order to conduct the interview designed for our case study, the volunteers would have had to send structured data in a very compact and error prone fashion.

As low cost smartphones and tablets have become more widely available, PDA based data collection in developing regions has been replaced by smartphones and tablet based data collection. An early solution of information collection toolkit based on Java enabled phones – called CAM – was proposed by Parikh et al. [3]. CAM relies on a paper based form that was augmented by an application running on a mobile phone.

A more recent and more complete toolkit based on Android – Open Data Kit (ODK) [4, 5] – has been developed and applied in a number of domains. ODK is a free and open-source set of tools to help organizations working in developing regions to collect data to make quick decisions. ODK has three major components. The first component is a mobile component that runs on Android phones. The second is a data storage component which runs in the cloud. The third is a web-based form builder to digitize paper forms for simple data collection or more

complex surveys. ODK is limited to collecting survey responses and elaborating results. Social accountability is not an explicit goal of the project, although it is one of its use cases. Furthermore, SAMo is not designed to support generic data collections and it supports a strictly defined workflow, thus requiring a much simpler software stack than ODK.

When discussing social accountability, Ushahidi [6] is the most popular and widely deployed application that best fits in the domain. Ushahidi is an open-source platform to easily crowd-source incident reporting using multiple channels, including SMS, email, Twitter and the Web. It allows users to submit eyewitness reports during a conflict or disaster, which are displayed on a map in real time. In cases where ordinary sources of news and public information are missing, it gives users a way to share information and shape political opinion, guide rescuers, or pool resources. It has been used to monitor elections in Sudan, document violence in Gaza, track the BP oil spill, and assist earthquake recovery efforts in Haiti. Although Ushahidi is a solid tool for empowering citizens, it did not fit our needs as it requires a baseline to be known and it does not support any particular process. SAMo is designed with a more systematic approach in mind by presenting the users with structured interview forms for predefined targets as opposed to allowing users to send free form reports at arbitrary locations.
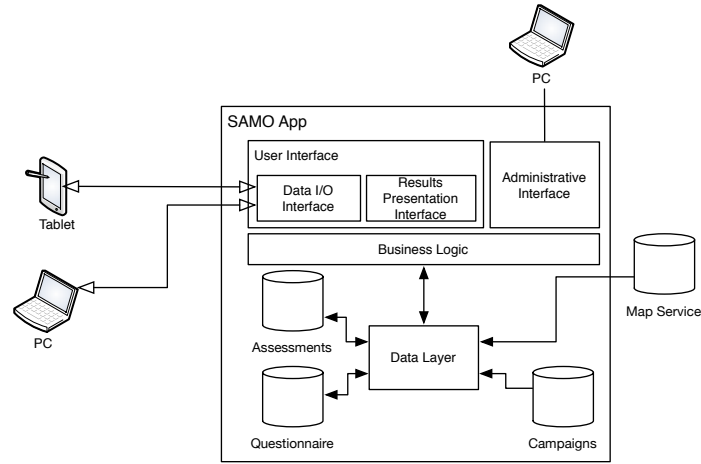
3 The SAMo platform

In order to conduct our pilot study in Moamba, we developed a platform called SAMo (Social Accountability for Mozambique) to collect procurement indices defined by a set of indicators to evaluate management and procurement of structures funded by the World Bank and local governments, located primarily in rural areas. The platform allows authorized assessors to collect data through interviews and it allows citizens to freely access all the results of the interviews. The data collection is performed during a *Campaign* within a fixed time frame and on a fixed set of target services.

Figure 1 displays the high level components of SAMo. The platform is composed of a Ruby on Rails web application and a mobile application running on Android tablets. The web application takes care of collecting data from the field and of displaying the results, while the Android application is used on the field by assessors to collect data in areas with no Internet connectivity and later upload it to the server. The responses collected during interviews are temporarily stored in a SQLite database on the mobile device used for the assessment and they can be uploaded to the server as soon as data access is available.

3.1 Roles

SAMo is designed to be used by 3 types of users: Managers, Assessors and Citizens.

Managers can be officials of an organization (e.g., the World Bank) that need to measure the quality of procurement and management of a category of government or donor funded buildings. They can create new assessment campaigns,

Fig. 1. Architecture of the SAMo platform

fix the goals of the evaluation, determine the indicators for the evaluation and enlist assessors to perform the interviews.

Assessors are responsible for collecting data about one or more targets during a campaign. An assessor acts as an intermediary between the Citizen and the SAMo platform.

Citizens are the ultimate beneficiaries of SAMo. They interact with Assessors by participating to interviews and they have access to the results and to aggregated reports on the SAMo website. Citizens have the actual ownership of the data and, in the long term, they will be provided with the technology for collecting data and generating reports themselves.

Different actors can take the roles mentioned above, depending on the actual campaign being conducted. For instance, an NGO active in the Education sector could use the application to conduct their evaluation campaigns having some of its personnel working as Assessors and some others working as Managers.

3.2 Data Model

Figure 2 depicts the core concepts of the data model on which SAMo is based.

The workflow of SAMo is centered on *Campaigns* conducted to assess a set of targets against a given set of indicators. A campaign contains a structured description of its goal, its data collection procedure, a time period during which data has to be collected, a set of *Targets* (services about which data is collected) and the *Indicators* to be collected for each target. One or more *Assessors* responsible for data collection is identified and assigned to the campaign. The assessors are tasked with the compilation of one *assessment* for each interview that they conduct. Assessors are independent from the people responsible for the implementation of the policies influencing the campaign targets to ensure a fairer evaluation.
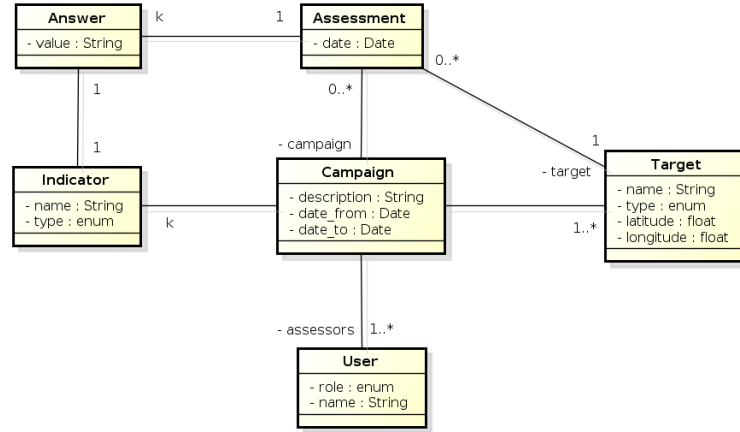
Fig. 2. SAMo Data Model

An indicator represents the specification of a measurement to be collected during an assessment for the targets of a campaign. An indicator is represented as a question during an assessment and is characterized by a type that constrains the type of value it can take (e.g., "Yes/No", "1-5 Likert scale", etc.). Indicators are reusable and are not strictly tied to a specific campaign.

Assessments are the unit of a SAMo campaign. They contain the responses collected during an interview related to one of the targets of the campaign. More specifically, they contain a reference to the assessor who conducted the interview, a reference to the target and the responses collected.

3.3 Workflow

SAMo aims at collecting and publishing the opinions of the end users of public services. Therefore, the typical usage workflow of the platform requires assessors to visit the target locations of a campaign and interview groups of beneficiaries, as shown in Figure 3. More specifically, the approach that we adopted is composed of the following steps:

1. A manager creates a new campaign. The relevant actors (citizens and assessors) are identified. The assessors are invited to register into the system and they are provided with access credentials.
2. The manager opens the campaign. A page containing the information about the campaign is published on the website of the application and the assessors are enabled to upload assessments.
3. During the time frame of the campaign, the assessors collect data about the targets using mobile devices running SAMo's Android client. The data can be inserted more than once and only the last entered value is the one that is saved. The output of this activity are the assessments.

4. At the end of a campaign the system marks it as closed and assessments cannot be accepted anymore. At this point, the final aggregated results of the campaign can be published.
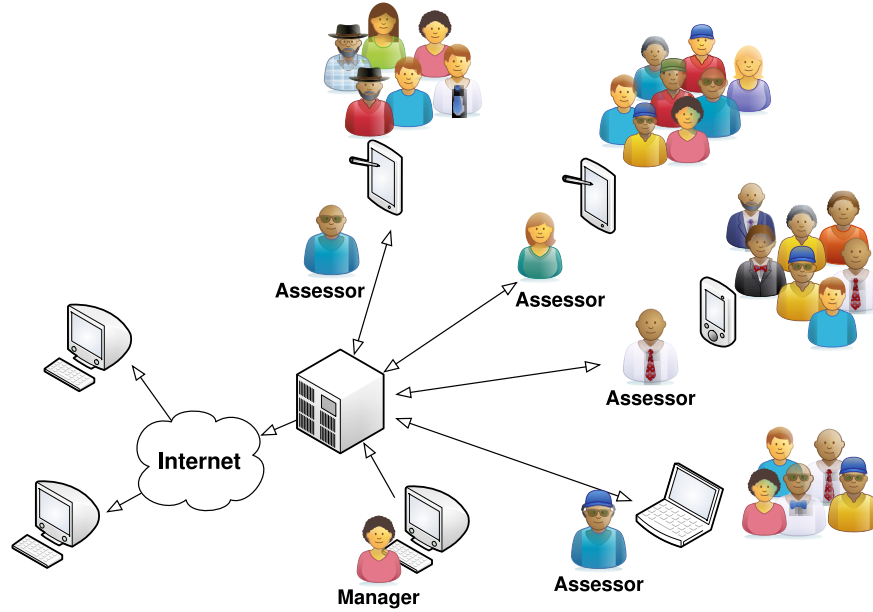
Fig. 3. Communication flow using the SAMo platform

The results collected are made available via the web interface as soon as they are uploaded by assessors. We rely on the APIs provided by Google Maps to display the location of the targets and to obtain satellite imagery of the buildings assessed (subject to availability). The web interface allows citizens to browse through the collected data in aggregated form at different levels of granularity (e.g., by campaign, by target) and to view the answers to individual assessments.

4   Pilot Study

We used SAMo in a pilot study promoted by the World Bank to collect procurement indicators about schools in the rural district of Moamba, Mozambique.

4.1   Overview of the District of Moamba

The district of Moamba is located in the northern part of the Province of Maputo, 75 km from the capital of the country. The estimated population in 2005 was of about 62,392 inhabitants, living in a territory of 4,628 km^2.

The District of Moamba is connected to South Africa through the border of Ressano Garcia and to Maputo by highway no. 4. Most of the roads of the district are made of packed dirt, resulting in significant transit problems, especially during the rainy season.

Electricity covers less than 1% of the population and water supply is available at household level in most of the administrative seats. Other villages use rivers, wells and boreholes for water supply, which are insufficient with respect to the needs of the population.

The district has 77 schools, 55 of which are level 1 primary schools, with a total of about 13,000 students and 330 teachers. Despite this, 55% of the population is illiterate and only 19.8% of the students attend school for at least five years.

Complete statistical data about the district of Moamba is available in Portuguese on the online portal of the Government of Mozambique[1].

4.2   Organization of the Pilot Study

The Moamba region and the targets were chosen not only for their general interest but also for the logistical and technical challenges they pose. To collect data, we equipped 12 volunteers with tablets and two jeeps and we embedded a sociologist within the interviewers to collect the reactions and attitude of the participants to the pilot.

Fieldwork started after a preparatory activity during which the local community was involved and prepared with the help of the district administrators and through the community radio. The interviewers collected assessments from teachers and parents of kids enrolled in the target schools for a period of six days, during which the volunteers visited the target schools, conducting the interviews with the aid of the tablets. The responses from the participants were uploaded to the SAMo server when an Internet connection was available (often in the evening whey the interviewers returned to Maputo).

The interest shown by the population in the initiative was higher than expected. A total of 677 interviews were collected out of an initial target of 500. The citizens participating to the pilot were particularly active in highlighting issues, proposing solutions, and in general participating to the iniative. Although such interest can be expected from people voluntarily showing up to be interviewed, it still provides some hints about the possible large-scale involvement of citizens.

A side result of the data collection activity is the geolocation of schools. Most of the schools in Moamba do not have a formal address and are not close to main roads. The data available to us was limited to the distance in kilometers from the closest administrative center and finding them in many cases represented a challenge volunteers had to tackle by embeeding volunteers living in the region to take them to the schools. The work of the volunteers and the usage of GPS-

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[1] http://www.portaldogoverno.gov.mz/Informacao/distritos/p_maputo/Moamba.pdf

enabled tablets allowed us to precisely geolocate all schools: the data is now publicly available on the SAMo platform website[2].

5   The Results

The 21 indicators collected during the assessment can be roughly classified in four types:

- 4 indicators measured general information about the school, namely the age of the building, the number of classrooms, availability of toilets and electricity.
- 8 indicators were meant to qualitatively assess the characteristics of some elements of the building, such as water-tightness of the roof, windows, doors, and floor.
- 9 indicators were related to the facilities and services, such as the presence of a cabinet to securely store books, cleaning of classrooms and toilets.
- Finally, one indicator ("The school has classrooms built by the community with local material?") could be used to measure the level of active participation and involvement of the citizenship.

To simplify data collection, most of the questions required a "yes/no" answer. For each target we collected a minimum of two interviews (in two cases) up to a maximum of 65 interviews (with an average of 13.54 interviews per target). The data is then made available at three levels of granularity: individual anonymous assessments, aggregated data about a target, aggregated data about all targets.

Although we expected a bit of variance to the answers given by different people to the same question about the same target, in some cases the ratio of "yes" and "no" resulted close to 50%. We thus aggregated data in three classes: "yes" ("no") if the percentage of positive (negative) answers is equal or above 80% of the assessments, "do not know" in any other case.
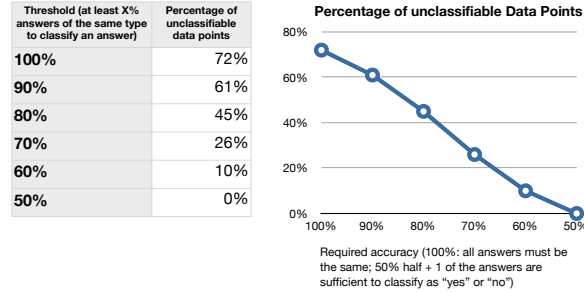
From an analysis of the results, it appears that most of the schools are lacking water and electricity supply (which is expected considering the data outlined in section 4.1) and security walls or lockable closets (in spite of material being regularly stolen, as reported by various citizens). The situation with various other indicators is mixed, with roughly half of the schools satisfying the procurement indicators we measured. We also need to remark that 45% of the data points (where a data point is the aggregated value of an indicator for one target) fall in the "do not know" category. Lowering the classification threshold decreases the number of data points we do not classify (see Figure 4 to see how "uncertainty" drops).

To conclude, it is worth mentioning that one of the parameters was meant to measure how active citizens are in tackling these issues. The question, in particular, was concerned on whether the school had classrooms built by the community with local material. The data shows that citizens took action in

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[2] http://www.ict4sa.org/samo

Threshold (at least X% answers of the same type to classify an answer)	Percentage of unclassifiable data points
100%	72%
90%	61%
80%	45%
70%	26%
60%	10%
50%	0%

Percentage of unclassifiable Data Points

Required accuracy (100%: all answers must be the same; 50% half + 1 of the answers are sufficient to classify as "yes" or "no")

Fig. 4. Classification threshold and accuracy

about one fifth of the schools, at a first glance independent of the status of the other indicators. Possibly a hint of the involvement that can be obtained without any specific action targeted to improve active citizenship.

6   Conclusion and Future Work

The last few years have seen a fast evolution of system to crowdsource data. Systems like Ushahidi [6] are extremely effective in involving people in the collection of data about variations over known situations and/or emergencies. Think, for instance, about signaling issues and frauds during an election. However, when the baseline situation is not known, a more systematic approach to data collection is required. This is the purpose of SAMo, a tool we built to systematically collect (procurement) data about targets, through campaigns conducted by volunteers. SAMO is composed of a web application and of a mobile client to collect data on the field.

We experimented SAMo in a campaign to measure procurement indicators about Primary Schools in the Moamba region in Mozambique. During the campaign we conducted 677 interviews. The results have given us the opportunity of experimenting the efficacy of the tool, while, at the same time, having a glance at the current status of buildings and basic services provided by schools in a rural area neighbouring Maputo. The result highlighted various critical situations, which, in some cases, surprised the interviewers themselves, used to the urban setting of Maputo.

The ultimate goal of the platform is fostering forms of empowerment of citizens, to make Governments more accountable (through measurement campaigns), but also by helping citizens understand what they can do to improving local services. This is a topic which, for us, started from a project in a developing country, but which is extremely relevant in both the developing and developed world.

A deeper understanding of how to deal with data quality and the definition of sustainability models for the data collection campaigns are some of the technical issues we need to address. From the project point of view, a return of the results

to those citizens who do not have access to the SAMo website, empowering the Maputo Living Lab [7] in the evolution of the platform, and experimenting with geographically ditributed, crowdsourced data collection exercises are some of the next steps.

Acknowledgments

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