Using Technology to Promote Participation in Emerging Democracies: VIP:Voice and the 2014 South African Election

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Abstract: Can new technology be used to improve the quality of democracy by boosting citizen participation? In this paper we report on the VIP:Voice platform, which was constructed to allow South African citizens to engage politically through an ICT platform, to report on political events in their communities, and to monitor their polling places on election day. We sent out over 50 million 'Please Call Me' messages encouraging South Africans to register on the system, and provided a multi-channel platform allowing citizens to engage politically via low-tech mobile phones and high-tech social media. We find starkly different demographic profiles of users across channels, indicating that the success of efforts to overcome marginalization using ICT will be partially determined by the technological channel used. Attrition of users across each step in the engagement process is high, and while thousands of citizens are willing to engage in costly political actions based only on intrinsic motivation, extrinsic incentives induce large increases in participation rates. Using the platform, we were able to recruit citizen volunteers willing to monitor 12 percent of the polling stations in 38 percent of the wards in the country.

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1. Introduction

Healthy democracies require that citizens actively participate in political life, from turning out to vote to monitoring government performance. Individuals in emerging democracies confront numerous institutional and personal obstacles to participation that marginalize them from political processes. Governments may engineer exclusion by purposefully limiting information or controlling media, constraining efforts to organize, and subverting institutions, like elections. Individuals may have low education levels, limited financial resources, geographic remoteness, and unfamiliarity with formal institutions. Local activists and social movements, non-governmental organizations, and international donors pursue a variety of strategies to help citizens overcome these barriers to action, including rallying support for protest and mass action, educating and mobilizing voters, monitoring elections, and reporting on corruption. Because these efforts seek to increase the extent and quality of citizen participation, they underscore some of the most fundamental issues towards understanding political behavior, including the role of information, the socio-demographic background of individuals taking action, the costs and benefits of engagement, and the interaction between intrinsic and extrinsic motivations.

Recently, the spectacular growth of information and communications technology (ICT) and digital media (DM) has revolutionized the work of individuals, groups, and organizations promoting political participation in emerging democracies. Unlike traditional -- and usually expensive -- media which permits one to one (telephones) or one to many (newspapers and radio) communication, ICT/DM allows a relatively inexpensive means for communication facilitating information-sharing and collective action across a large and dispersed user base. For example, ICT/DM played a central role catalyzing spontaneous citizen-generated forms of participation and subsequent political change in the Arab Spring and Color Revolutions (Tufekci and Wilson 2012, Breuer et al. 2014). Organizations and donors also increasingly fund ICT/DM projects to promote democracy and governance in the developing world, harnessing modern tools from social science to rigorously evaluate the effects of technology platforms on individual behavior and political processes, including improving electoral integrity (Bailard and Livingston 2014; Goldstein and Rotich 2008); crowd-sourcing information on violence, corruption,

and government performance (Aker et al. 2011, van der Windt and Humphreys 2013, Findley et al. 2013, Callen et al. 2015; Cecchini and Scott 2010; DeRenzi et al. 2011; Findley et al 2014); and strengthening accountability between citizens and politicians (Grossman, Humphreys and Sacramone-Lutz 2014). However, not all ICT/DM programs work and their potential impact depends on their success at registering participants and encouraging them to undertake meaningful political action. This, in turn, requires an understanding of how platform design and functionality intersects with incentives and intrinsic motivations to deliver technologically-driven participation.

To address these challenges, we designed and deployed a unique ICT/DM platform during South Africa's 2014 national election. The platform, called "VIP:Voice," ran on multiple ICT/DM channels and experimented with the magnitude and sequencing of incentives. The platform attempted to engage citizens in forms of digital political action (registering on the platform, opinion polling, crowd-sourcing information on protests and violence, and reporting on voter experiences) along with costly, real-world actions (voting, volunteering to be a Citizen Observer, and recording data from posted declaration of results forms, or tallies, the day after the election). We induced experimental variation in the incentives to register on the platform in the first instance, and then performed a set of cross-randomized experiments in the framing of a get-out-the-vote (GOVT) campaign and the magnitude of subsequent incentives for engaging in digital and real-world political behavior. To our knowledge, VIP:Voice forms the largest, built-from-scratch, free-standing ICT/DM platform developed to date in an emerging democracy's election.

Implementation of VIP:Voice proceeded in four phases. Phase 1 began with the launch of the platform four weeks before the election, employing five channels to recruit participants: USSD, a standard phone (not internet capable) channel; and Mobi, MXIT (South Africa's largest social network), GTalk and Twitter channels (available via internet on feature or smartphones).[1] Within the USSD channel, we experimented with the effectiveness of free usage, paid usage, and participation lotteries as means to enhance registration. Phase 2 consisted of a set of surveys collecting demographic

[1] VIP:Voice's has no prior participant base. Because it does not rely on any pre-existing platform or defined set of users, it allows an unusually pure proof of concept as to whether and how ICT tools can engender political participation.

information and voting intentions, conducting rolling opinion polls, and crowd-sourcing information on local political activity in the weeks leading up to the election. Phase 3 experimented with incentives to recruit and field volunteer citizen election monitors who would incur the real-world costs of reporting vote totals from their polling places the day after the election. Phase 4 tested a set of intrinsically and extrinsically framed GOTV messages and polled voter perceptions of the process on election day. We use the variation generated by this sequence of experiments to test a set of hypotheses on the dynamic relationship between extrinsic and intrinsic motives in generating political participation.

The evolution of engagement on VIP:Voice illustrates the promise and perils of ICT/DM platforms to engender political participation. From 50 million text messages to promote registration and advertisements in print and social media, more than a quarter million contacts initiated with our platform; 134,000 answered an initial 'engagement' question; 91,000 registered; 35,000 gave demographic information; 2,500 volunteered to serve as election monitors; and 5,000 responded to the GOTV experiment. The USSD channel on standard phones generates a user base that is largely female and black, while the social media channels are more male, coloured (mixed race), and younger. From a sample of registered users, we recruited citizen monitors in 38% of the wards of South Africa and deployed 347 citizen monitors to polling places. Seen in a positive light, the platform promoted low-cost digital engagement in addition to costlier, real-world forms of participation in the electoral process and operated at a national scale. More skeptically, we yielded a non-randomly selected sample and the platform suffers rates of attrition of roughly 50% for every subsequent act of engagement that we ask of individuals over the course of the election period. The platform therefore produces a questionable sample on which to draw strong population inferences, but also provides a rich environment to understand the effects of incentives on national participation rates.

To preview results, in initial recruitment we find that even very small extrinsic incentives effectively drives participation and does not, on net, crowd-out intrinsic motivations (Bénabou and Tirole 2003, 2006), contrary to studies suggesting a strong likelihood of crowd-out when incentives are low (Gneezy and Rustichini 2000). In line with prospect theory (Kahneman and Tversky 1979, Camerer 2004), lotteries induce

greater enrollment than a small fixed subsidy. At the same time, ICT/DM prompts substantial digital and real-world participation even when individuals paid full communications costs, indicating the importance of intrinsic motivations for engagement. Participation drops sharply shifting from relatively costless digital engagement to costly participatory activities, and drops most dramatically among those who entered the platform with the lowest cost. Participants who have a relatively shallow commitment to political action produce the highest levels of this attrition. Linking these results, attriting participants more likely arise from users on social media channels, suggesting that lowering barriers to digital participation may attract people who are less intrinsically engaged, and therefore less likely to transfer engagement with the platform into real-world action. We also illustrate how the use of extrinsic incentives in an initial phase will accentuate the marginal effect of incentives on participation in subsequent phases.

South Africa's institutional and ICT/DM environment create an excellent setting and establish important scope conditions and for a comparative study of participation in emerging democracies. The transformative elections of 1994 brought an end to apartheid, allowing for universal franchise and energizing democratic participation on the part of the non-white majority for the first time. But recent factors potentially erode the quality of extent of political engagement. The ruling African National Congress (ANC) has received strong majorities in all of the country's post-apartheid elections, limiting competition where elections are seen as foregone conclusions. The 2014 election took place during rising dissatisfaction with the ANC and incumbent president Jacob Zuma, who faced numerous allegations of corruption and perceptions of poor performance regarding South Africa's rising income inequality and crime rates. All swaths of South African society continue to feel the lasting economic and social remnants of apartheid that remain salient across people's interactions with institutions and markets. Therefore, despite many South Africans' intrinsic belief in the democratic system, countervailing factors and external constraints suggest varying levels of voter mobilization. This reflects common assumptions about political behavior across emerging democracies where citizens participate at different rates given variation in institutional and individual factors. Moreover, similar to many developing countries, South Africa has enjoyed a "tech boom" in recent years and South Africa boasts the highest per capita cellular phone connections

in Africa and the fifth highest rate of internet access, although access varies significantly across the country. Technological development in South Africa outpaces other parts of Africa, increasing the feasibility of our project: given the rapid rate of ICT/DM growth, South Africa represents where much of Africa will be in a few years' time.

Our study contributes to three distinct literatures. First, we provide micro-foundations to a rich set of studies on political participation in developing democracies by examining how variations in incentivization, cost, and framing can drive engagement with politics and the public sector (Dal Bó et al. 2013). Second, we contribute to the growing empirical literature addressing the comparative effectiveness of different ICT/DM platforms at driving uptake and adoption across a wide variety of contexts such as health (Chi et al. 2010, Lester et al. 2010, Dupas 2014), agriculture (Jensen 2007, Aker 2010, Fafchamps and Minten 2012), and bureaucratic performance (Callen et al. 2013, Hellström and Karefelt 2012). Third, we lend insights, methods, and data to studies concerned with using new techniques to address improving electoral processes (Callen and Long 2015; Callen et al. 2015; Ichino and Schundeln 2012; Collier and Vicente 2014; Hyde 2011; Kelley 2012).

We structure the paper as follows: Section 2 motivates our theory underlying political participation and Section 3 describes the context and design of the study. Section 4 presents an overview of participation and representivity, and Section 5 tests our hypotheses. In Section 6, we discuss the implication of our results for future efforts to induce electoral participation using ICT/DM.

2. Theoretical Motivation

2.1. Participation in Developing Democracies

Social scientists have long studied the factors driving political participation in consolidated democracies (Verba et al 1978; Powell 1980; Wolfinger and Rosenstone 1980). But the determinants and contours of participation in emerging democracies likely arise from distinct causes. Unique to these contexts, imperfect and incomplete regime transition may curtail involvement and strengthen marginalization. The public may only have weak associations with inchoate democratic institutions, and those institutions may create severe constraints. Political actors may motivate or discourage the extent and

nature of citizen action, taking advantage of individuals more vulnerable to external pressures or rewards (such as vote-buying) and weak enforcement of electoral safeguards (such as ballot secrecy) (Nichter 2008; Gans-Morse, Mazzuca, and Nichter 2014; Ferree and Long 2015; Stokes 2005; Stokes et al. 2013; Kramon 2009).

Individual level factors also affect participation. A citizen's potential motivations fall under two broad categories: intrinsic and extrinsic. Citizens may experience intrinsic desires to engage in politics from commitments to democratic principles (Blaise 2000; Bratton, Mattes, and Gyimah-Boadi 2005; Lindberg 2006) since the ability to vote provides a new experience to express voice and act in the public realm, previously restricted under authoritarianism[2]; or strong loyalties to social groups based on identity, like ethnicity (Horowitz 1985). At the same time, individuals may face significant costs to participation driven by a lack of information about electoral processes or candidates; low literacy rates; remote, inaccessible, or overcrowded polling stations; or living far from the capital. Individuals facing such costs may fail to participate in meaningful ways even if they possess the intrinsic desire to do so.[3] Citizens may therefore desire material gains received through extrinsic benefits, such as gifts offered in exchange for participation (Wantchekon 2003; Chandra 2004; Posner 2005). Together, an individual's intrinsic and extrinsic desires may interact in additive ways, or potentially crowd each other out, making it difficult to predict the likelihood of taking action. [4]

Faced with these realities, the widespread adoption of ICT and digital media (ICT/DM) by citizens of developing democracies presents a particularly promising new set of opportunities to engender participation (Shirazi 2008; Alozie, Akpan-Obong, and Foster 2011; Bailard 2012; Bratton 2013). Mobile phones alter the costs of communication and consequently reduce the barriers to information sharing between actors and individuals — including governments, political parties, civil society groups, and ordinary citizens. The low cost of cellphones encourages broad usage in the exchange

[2] In Africa, for example, founding elections (the first democratic elections after authoritarian rule) tend to have higher turnout than later elections (Bratton 1998).

[3] We note, however, that standard markers of marginalization like low education and rural domicile tend to correlate with higher levels of participation in many consolidating democracies (Kasara and Suryanarayan 2014; Kuenzi and Lambright 2010; Wade, Groth, and Lavelle 1993).

[4] Evidence from multiple disciplines examines the interplay between intrinsic and extrinsic motivations, including how they affect candidate selection (Isbell and Wyer 1999), principal-agent relationships (Benabou and Tirole 2003), and motivations to work (Gagné and Deci 2005).

of information across all types of demographics and over long distances (Aker and Mbiti 2010). The concomitant increase in internet access via feature and smartphones, and the popularity of social networking further enhance the range of communication modalities available to citizens.[5] ICT/DM's ability to reduce barriers to information-sharing also facilitates collective action and can therefore radically shape who, how, and when citizens participate. The impact of these technologies may gain potency for communities in remote areas with a lack of infrastructure.

Alongside numerous evaluations in economics[6], evidence suggests that ICT/DM affects political processes in developing contexts as well. ICT/DM powerfully facilitated engagement and organic political movement associated with the Arab Spring and the Color Revolutions (Breuer 2012, Tufekci and Wilson 2012; Shirazi 2008); and impacts corruption (Bailard 2009), civil conflict (Pierskalla and Hollenbach 2013; Shapiro and Weidmann 2014), and election monitoring (Callen et al. 2015; Goldstein and Rotich 2008; Bailard and Livingston 2014) in emerging democracies.

More radically, a number of studies employ ICT/DM to *engineer* participation in the absence of pre-existing organizations or platforms (Aker, Collier, and Vicente 2011; Findley et al. 2013; Grossman, Humphreys, and Sacramone-Lutz 2014). These projects expressly attempt to increase political participation and engagement of those citizens typically marginalized by standard political processes like the poor, those in peripheral regions, and women. While this research shows some success in generating participation, weak involvement in ICT platforms and high rates of attrition from original intake samples present challenges for engagement. These patterns especially hold for projects that require action (not just passive absorption of information) like submitting reports to a

[5] Access to the internet via computer or feature and smartphone provides enables plausibly more efficient forms communication compared to standard phones. Cellphones and internet access each provide channels to "push" and "pull" information content to users, such as real time "crowd-sourced" reports on various activities as they unfold (these reports are often geolocated and can generate immediate actions in response, such in the case of humanitarian disaster. ICT/DM allows individuals to obtain and share information in a new, radically decentralized way that is fundamentally different from the top-down structure of traditional media controlled by providers – often the state -- like radio, television, or newspapers.

[6] Economists document impacts of ICT/DM on agricultural markets (Jensen 2007; Aker 2010;; Aker and Fafchamps 2013; Kiiza and Pederson 2012; Muto and Yamano 2009; Zanello 2012); health (Chang et al 2011; Dammert, Galdo and Galdo 2014; Garfein et al 2012; Jamison, Karlan, and Raffler nd; Leong et al 2006; Lester et al 2010; Lund et al 2012; Pop-Eleches et al 2011); uptake of social benefits (Blanco and Vargas 2014); education (Aker, Ksoll, and Lybbert 2010); and mobile money (Jack and Suri 2011, 2014; Mbiti and Weil 2011; Morawczynski and Pickens 2009; Blumenstock, Eagle, and Fafchamps 2011).

crowd-sourcing platform. Despite its low cost, citizens' use of ICT/DM may still encounter significant barriers in developing countries, and issues such as literacy, connectivity, and the costs of ICT/DM may ironically limit the participation of precisely those citizens who already face exclusion from political activity.

Prior studies regarding the relationship between ICT/DM and participation make salient several unresolved issues that we seek to address in our study. Despite the fact that cost effectiveness is a primary justification given for ICT/DM, many studies have started from research-sampled phone lists that required 'boots on the ground' in order to draw the initial contacts (such as via household surveys). This is very expensive and does not provide information on the types of samples that would be generated by an ICT-recruited sample. Second, most existing studies have only launched using a single channel and therefore cannot speak broadly to ICT/DM participation but rather just to that of a specific medium. Finally, while several studies manipulate intrinsic and extrinsic motivations by experimentally varying the cost of interaction (Grossman, Humphreys, and Sacramone-Lutz 2014; Findley et al 2013), most feature a single cost and incentive structure. They therefore do not fully illuminate the dynamics of how costs and extrinsic incentives interact with each other over the course of time to determine the evolution of participation.

We address many of these challenges in our research design arising from observational and experimental variation across critical factors driving participation. First, we obtain individual-level variation in engagement measured by the first intake survey question asked on the platform, and we measure variation in the cost of entry into the system across different platforms (smartphone-based social media channels provide a more streamlined experience than USSD). The activities we ask people to engage in vary in cost, from answering online questions to monitoring their polling places. Over this, we randomize four additional dimensions, including the financial benefit of enrolling in the platform, the financial benefit of engaging with the platform subsequently, the form in which that financial incentive is offered (fixed transfer or lottery), and whether the messaging that surrounded our GOTV campaign features an 'intrinsic' or 'extrinsic' framing, or no framing at all. Our design therefore allows us to examine not just the

impact of different technology channels on engagement and the effect of incentives, but to explore how these factors interact and evolve dynamically.

2.2. Hypotheses on Motivating Participation

We now develop the primary theoretical parameters critical to understanding the drivers of political participation in emerging democracies. First, intrinsic motivation will induce some individuals to participate in an election oriented ICT/DM platform even in the absence of external incentives. In a study where we experiment with incentivized treatments, these intrinsic motives (analogous to expressing a commitment to democracy or loyalty to an ethnic group) drive participation in the control arm. Second, building from these baseline levels of intrinsic motivation, additional external inducements like economic incentives will enhance participation rates (analogous to parties buying votes or giving gifts). Third, the effectiveness of extrinsic incentives will interact with other dimensions of the environment such as the costs of the action the individual takes, the degree of intrinsic motivation in the incentivized population, and the history of extrinsic incentives offered. We develop these ideas into formal hypotheses tested experimentally in Section 5.

We motivate our participation hypotheses using a simple model. Consider a set of agents who have intrinsic motivation to participate in a political activity equal to η, distributed as $Unif\left[0,\bar{\eta}\right]$. In stage 1, agents *i* are recruited through an ICT/DM channel *j* to participate in an activity that bears utility costs $c_{j1}>0$ and features welfare from incentives $\beta_{j1}\geq 0$. Individual participation through a given channel is given by the indicator function $P_{ij1}=1\left(\eta_i+\beta_{j1}>c_{j1}\right)$, requiring that the sum of intrinsic and extrinsic incentives exceed the cost of participation. We assume that $\bar{\eta}>c_{j1}\ \forall\ j$, indicating someone will choose to participate on each channel.

Given this setup, the participation *rate* for each channel $E(P_{j1}) \equiv \rho_{j1}$ will be $\frac{\bar{\eta} + \beta_{j1} - c_{j1}}{\bar{\eta}}$, and the average intrinsic motivation on a channel as a function of the costs and extrinsic incentives is $E(\eta \mid P_{ij1} = 1) = \bar{\eta} - \left(\frac{\bar{\eta} + \beta_{j1} - c_{j1}}{2} \right)$.

In the second stage, agents are asked to participate in an additional activity that bears costs c_{j2} and incentives β_{j2}. Agents are only present to be incentivized in stage 2 if they participated in stage 1, so $P_{ij2} = 1\left(\left(\eta_i + \beta_{j1} > c_{j1} \right) \text{ and } \left(\eta_i + \beta_{j2} > c_{j2} \right) \right)$. Given this, a shift in stage 2 incentives β_{j2} will only have an effect on stage 2 participation rates if it operates on a subset of individuals who are present among participants based on stage 1 costs and incentives. Thus,

$$\frac{d\rho_{j2}}{d\beta_{j2}} = \begin{cases} \frac{1}{\bar{\eta}} \text{ if } (c_{j2} - \beta_{j2}) > (c_{j1} - \beta_{j1}) \\ 0 \text{ else} \end{cases}$$

Consequently, the higher are the incentives in the first stage (β_{j1}), the higher is the probability that the type of individual for whom incentives are effective on the margin is still in the user group to whom second stage incentives β_{j2} are offered.

Hypothesis 1: Agents are induced to political action both by extrinsic and intrinsic motives.

H1a: Participation in the absence of extrinsic incentives will be non-zero ($\bar{\eta} > c_{j1} \ \forall \ j$).

H1b: Participation will increase with extrinsic incentives ($\frac{d\rho_{j1}}{d\beta_{j1}} = \frac{1}{\bar{\eta}} > 0$).

H1c: Prospect theory predicts that participation will respond more strongly to β_{j1} if incentives are presented as a lottery rather than as a small and certain revenue-equivalent transfer.

Hypothesis 2: More user-friendly technology (MXIT) will select in less politically motivated and committed engagers than less user-friendly technology (USSD). $\frac{dE(\eta \mid P_{ij1}=1)}{dc_{j1}} = \frac{1}{2} > 0$

Hypothesis 3: Participation will fall as individuals are asked to undertake actions with higher real world costs. $\frac{d\rho_{j1}}{dc_{j1}} = \frac{-1}{\bar{\eta}} < 0$.

H3a. The decay in participation as costs increase occurs among the individuals who were least engaged to begin with.

H3b: Declines in participation over time will occur among the individuals who were least engaged to begin with.

Hypothesis 4: The effect of subsequent incentives will be stronger in the group that was extrinsically motivated in recruitment

H4a: Differential response rates on incentivized versus un-incentivized questions will be larger for the group given extrinsic incentives at recruitment (likelihood that $\frac{d\rho_{j2}}{d\beta_{j2}} > 0$ is increasing in β_{j1}).

H4b: The differential response to later incentives for the initially extrinsically motivated group will disappear as individuals are asked to undertake actions with high costs (as soon as $c_{j2} > c_{j1} + (\beta_{j2} - \beta_{j1})$, $\frac{d\rho_{j2}}{d\beta_{j2}} = \frac{1}{\bar{\eta}}$ in both groups there is no differential effect).

H4c: Appeals to extrinsic factors such as visibility of political activity will be more effective in the group initially given extrinsic incentives.

Our study features randomization of β in multiple rounds and therefore can test H1b, H1c, H4a, and H4c rigorously using only experimental variation. We will test other hypotheses using observational variation, taking answers to the 'engagement' question as a proxy for η and making assumptions about costs across platforms (H2; MXIT less

costly for digital participation than USSD), across activities (H3a and H4b; more costly to fully register as a CM volunteer than to answer a survey question), and across time (H3b; net benefit of digital participation declines across waves).

3. Setting and Research Design

3.1. Setting: The 2014 South African Election

South Africa provides an excellent setting for a study of political participation in an emerging democracy. The 2014 national and provincial elections represented its fifth set of general elections since the transition from apartheid in 1994, allowing for democratic participation in South Africa for the first time. The ruling African National Congress (ANC) has won national contests with wide and consistent margins, greatly outpacing its nearest competitor, the Democratic Alliance (DA), a regionally based party. Other smaller parties have not consistently gained traction. The ANC's dominance limits political competition, potentially discouraging participation since elections are seen as foregone conclusions. The 2014 contest had the lowest voter turnout in the post-apartheid era. Beyond the party system, the economic and social remnants of apartheid still affect South African society and could plausibly impact participation. Although they are now in the political majority, many blacks do not feel that the ANC's performance lives up to the promises made as apartheid ended. The 2015 unemployment rate of 26% is the highest in a decade. Over half of youths are jobless. While whites retain many economic privileges, they lack representation in the ANC. Regardless of race, many voters perceived the ANC, and the incumbent president Jacob Zuma, as increasingly corrupt. South Africans reflect characteristics of voters in other emerging democracies where variation in a host of institutional and individual factors results in differential rates of participation.

Election monitoring groups generally rate South Africa's Independent Electoral Commission (IEC) highly. Because elections lack significant competition, baseline incentives for citizens to engage in the types of activities we study were likely to be low compared to what it might have been in a first or second election, or where competitive pressures raise interest in politics. At the same time, South Africa represents a large category of cases in which elections, while relatively new, are also routinized. Should

ICT have a broad impact on political participation, it must do so in places like South Africa, where natural incentives to participate might be relatively low.

Many developing countries have enjoyed a "tech boom" in recent years. South Africa boasts the highest per capita number of cellular phone connections in Africa[7], and the fifth highest rate of internet access. Although most South Africans are not users of social media platforms, cell phone saturation was almost 90 percent in the 2011 census and has risen to almost 100 percent. Feature phones and smartphones currently have a saturation rate of 70 percent. More economically developed areas of South Africa have higher usage rates, as well as among younger and more male populations (see Table 4 for more information). Given the rapid rate of ICT/DM development in Africa, South Africa lends insights into middle range developing countries while foreshadowing where many countries will arrive shortly.

3.2. Research Design

The project involved four stages: (1) registration in VIP:Voice, and then engagement (2) before, (3) during, and (4) after the election. Here, we provide a summary overview of the sequence of events and then more detail on each phase in the next section.

We worked with Praekelt, a major South African technology firm, to design our multi-channel ICT/DM platform and to recruit and register as broad a spectrum of the electorate as possible. Unlike other studies that build ICT/DM platforms from a pre-existing database of prior users or conduct door-to-door surveys to enroll participants, we recruited participants directly from the overall population via the platform. While this created operational challenges, it meant that every South African voter could potentially enter the system.

In **"Phase 1,"** beginning on the 7th of April 2014 (one month before the election), we recruited South African citizens into the ICT/DM platform. Users could interact with VIP:Voice through five channels, including SMS/USSD, MXIT, Mobi, GTalk, and Twitter. Standard phones with no internet required interaction via short message services (SMS or "text messages") and unstructured supplementary service data (USSD), an

[7] 118 connections per 100 citizens; Nigeria has 96/100.

interactive text-based system that can reach users of all types of phones. MXIT is South Africa's largest social media site, and works on feature and smartphones; Mobi is a provider of smartphone platforms; GTalk and Twitter could be accessed by feature or smart phones.

Splash ads and banners advertised recruitment on Twitter, MXIT, and Mobi. We also reached people under Livity Africa's Voting Is Power (VIP) campaign, leveraging their existing reputation as a respected non-partisan youth-oriented media outlet. We heavily targeted SMS/USSD interactions given the widespread penetration of mobile phones in rural areas, but where other digital media may not reach. We attracted people to this channel primarily advertising with Please Call Me (PCM) messages. Facilitated by telecoms, subscribers send an average of 14 million overall unique PCMs per month in South Africa. A person texts a PCM to another person requesting a phone call. The people who buy advertising space on the messages pay for them, not the senders. We purchased advertising space for VIP: Voice for 49.8 million PCMs. We randomized the PCM message with a 'standard' arm encouraging registration, but paying full messaging costs to interact with the platform; a 'free' arm with all interaction fees covered; and a 'lottery' arm offering a chance to win 55R.[8] On entering the system, users were asked an 'engagement' question about their voting intentions in the upcoming election[9] and then asked to sign the Terms & Conditions to register in the system.

In **"Phase 2,"** the platform invited registered individuals to provide their demographic data and report on election-related events with information pushes and pulls leading up to election day. Participants continued engagement through their initial enrollment channel. In practice, Phase 2 involved completing five separate pre-election surveys. The first survey asked a brief set of demographic questions (age, race, gender, and reported participation in the 2009 election). Completion of the demographic questions was monetarily incentivized with a lottery for all participants. Participants also were asked to complete two election-related surveys. The "What's Up?" survey asked a

[8] The text of the PCM message always read *"Join VIP:Voice to help make elections 2014 free and fair. Dial .."*. The standard treatment then said "*Standard rates charged"*, the free treatment said "*participate for free"*, and the lottery treatment said "*stand a chance 2 win R55 airtime"*.

[9] The text of engagement question was as follows: "It's election time! Do u think ur vote matters?" Response options included, "YES, every vote matters," "NO, but I'll vote anyway," "NO, so I'm NOT voting," "I'm NOT REGISTERED to vote," and "I'm TOO YOUNG to vote."

set of questions on local campaign activities, while "VIP" posed a set of relatively standard polling questions on participation in local events, evaluation of ANC performance, and probability of voting.

In addition to these surveys, which were presented via drop-down menus, the system pushed questions designed to track real-time shifts in political opinion and incidents of political activities in the month prior to the election. One set of these questions, called the "Push" survey, asked about local political activities at three different times prior to election day, randomizing the day on which an individual received the survey. A second set of questions, called "Thermometer," asked about voting intentions and party support. We sent thermometer questions out two weeks and one week before the election. Users could complete surveys in any order and failure to complete one survey did not preclude answering questions on another. Phase 2 thus consisted of digital forms of engagement as all activities involved interacting with the platform.

"Phase 3" sought to evaluate whether ICT/DM could recruit citizens into a more meaningful and costly real world form of participation: namely observing and reporting on electoral outcomes at polling places. From the group of "high compliers" in Phases 1 and 2 (those who completed all or most questions), we recruited a set of volunteers to serve as Citizen Observers (COs). The set of tasks expected of Citizen Observers (COs) involved returning to polling stations on the day after the election to observe whether or not a tally sheet had been posted, to submit information about the tally via SMS, and, if equipped with a phone that could take photos, to take a photograph of the results sheet.

Electoral law in South Africa requires the posting of tally sheets by polling center managers. Posting of sheets improves electoral transparency, allowing voters in an area to observe their local result. Observing whether or not a sheet has been posted represents a tangible election observing activity a citizen might reasonably (and safely) participate in that could provide useful information about the adherence of local polling stations to electoral procedures. By reporting information from the tally sheet, a CO also makes it possible to evaluate whether local posted results match centrally reported results (Callen and Long 2015). Hence, these activities represented valuable ways in which ordinary citizens can participate meaningfully in observing electoral equality.

We offered an extrinsic incentive to participate as a CO (randomized as either a token amount of R5 to cover phone fees or a more substantial inducement of R50). Those who indicated an interest in serving as COs received a new set of terms and conditions to accept and provided personal information to allow us to identify their polling stations. We subsequently refer to 'CO volunteers' as those who volunteered as COs, signed new T&Cs, and provided personal information.

Phase 3 included two experiments, one randomized and one better thought of as a natural experiment. Unfortunately, due to a data error, the platform actually invited COs to report on election tallies that were not drawn from the initial CO volunteers. In our design the volunteer and invited-to-monitor groups were supposed to be the same, but in practice they were different. Instead, we inadvertently recruited actual COs almost exclusively from registered USSD participants in the "standard" arm. These COs were also offered one of two different incentives to complete their tasks (R5 or R50), and assignment to these incentives was as-if random.[10] However, given that this variation arose as a result of a data error and was not strictly controlled by the researchers, we consider this latter incentive to form a natural experiment in the spirit of Dunning (2012).

In **"Phase 4,"** we implemented a Get Out the Vote (GOTV) experiment and two surveys, one of voter experience at polling stations on election day (with free participation), and a second post-election survey to gauge satisfaction with the electoral process (incentivized with a lottery). We conducted the GOTV experiment and both surveys on all 78,108 individuals who had completed registration in the system. In the GOTV experiment, we randomly assigned individuals to either a control group or one of two treatments. An 'intrinsic' message consisted of a reminder to vote in the election, and motivated the 'voice' dimension of political participation. The 'extrinsic' treatment included the reminder plus a message reminding citizens that their inked finger would show others that they had voted, designed to activate considerations of social pressure to vote (Jung and Long 2015).[11] On May 8 (the day after the election), we texted participants asking whether or not they had voted. Those who responded affirmatively

[10] See Appendix A2.

[11] *Control:* no GOTV text message. '*Intrinsic' Treatment:* received the text message "Make a choice, have a voice, vote!". '*Extrinsic' Treatment:* received the text message "Make a choice, have a voice, vote!" Your inked finger will show everyone that you have."

were asked to verify their vote by providing information on ballot color and sending a photograph of their inked fingers.

Figure 1 displays a schematic of the overall design of the project, showing the temporal division of the study into the four phases. Blue lines represent experiments conducted at different stages. The first of these experimentally varied incentives to register conducted within the PCM recruitment. The second examined experimentally whether the ordering of SMS questions altered participation rates. Third, we randomized whether the inducement to serve as an election monitor included a financial incentive (we show only the experiment in actual COs, not the experiment in volunteers). The fourth included the GOTV priming experiments.

4. Usage of the VIP:Voice Platform

4.1. Recruitment and Registration

The total recruitment effort, including close to 50 million PCM messages, logged 263,000 individuals contacting the platform, 129,308 responding to an initial engagement questions, and 90,646 individuals completing the Terms and Conditions to register for the platform.[12] Just under half of those registered entered through the USSD channels associated with the PCMs; a similar number entered via MXIT. The remainder was brought in through Mobi or print advertising, and a very small number entered via Gtalk or Twitter.[13] We define the strata for the study as the intersection of the channels and the USSD recruitment randomization groups, meaning that some comparisons are experimental (the USSD PCM recruitment groups) and some are observational (across channels). The three experimental USSD strata and the MXIT stratum contain almost 94 percent of all registered users.

Table 1 'Recruitment and Participation Numbers' provides the total number of individuals at various stages on the participation waterfall, broken down by the study

[12] Appendix A1 shows the anticipated recruitment numbers provided by Praekelt; these were roughly four times the number that actually enrolled.

[13] USSD users who enrolled in the program directly rather than by clicking through a PCM may come from print advertising, or may have heard about the platform through other channels but registered on a phone. This self-enrolled USSD group is not used in any experimental analysis because PCM treatment status cannot be assigned.

strata. Because many PCMs may be sent to the same person, we cannot define 'uptake' in the usual way for this experiment. Rather, we divide the number of registered users by the number of PCMs sent under each treatment to calculate a yield rate, implying an average yield rate of .08% per PCM sent for the USSD channels, or 1 in 1900 PCMs.[14] Only one third of those who initiated contact with the system completed registration.

Attrition continued in Phase 2. Of the 90,646 people registered, 34,718 (38 percent) completed the four demographic questions and 15,461 (17 percent) answered the demographic questions and one of the other four Phase 2 surveys.

In Phase 3, we invited 41,863 individuals to volunteer as community observers (COs). Of these, 2,498 agreed, signed the new T&Cs, and provided all relevant location information required to identify their polling place. We asked a different group of 1,863 individuals to actually deploy on election day; of these 332 submitted information via SMS about their polling stations.

In Phase 4, we invited 77,878 registered participants to respond to the GOTV message and the election experience survey. Of these, 5,038 (6 percent) responded to the GOTV questions on participation, and 6,978 (9 percent) submitted information regarding their "Voter Experience" on the day of the election (a checklist modeled after those of official election monitors).

These numbers are impressive and daunting in equal measure. On the one hand, the platform saw a quarter of a million people initiate contact, solicited information on political engagement from more than 100,000 citizens, registered 90,000 into the system, and two and a half thousand people completed all the required information and registered to serve as COs. On the other hand, this represents a tiny fraction of the individuals originally approached with PCM messages, and attrition at every step of the process---from contact initiation, to the enthusiasm question, registration, answering any of the Phase 2 questions, answering any Phase 4 questions, and volunteering as a monitor---is on the order of 50% per step. Out of the individuals who registered in the system, roughly half never engaged again, and the other half participated with the platform in some way.

[14] This cannot be interpreted as a standard yield rate, in that PCMs may be sent many times to the same person and the same individual may have received PCMs with different treatment statuses. What we show here is the yield *per PCM*, not the rate *per person sent a PCM* These yield rates are inline with our expectations based on previous PCM campaigns conducted by our implementing partners.

Table 1 shows the 'waterfall' of participation over the course of the study and illustrates both the promise and the very real challenges of engaging citizens through ICT.

4.2. Demographic Representativeness of Participation

Some activities, such as election monitoring, may only require a highly selected group of individuals with sufficient enthusiasm. For others (such as opinion polling or measuring turnout) the validity of the exercise relies on the platform producing a representative sample of the voting population. Establishing the extent to which various channels deliver a representative sample proves important.

To address this, we compare representative information for the country as a whole to the samples generated from our platform. We use the 2011 South African Census and the electoral results from the previous election to present the national averages of each variable first and then show the average response on each channel of the platform.

Unfortunately, the large attrition within phase 2 means that we only have demographic data for 38% of the registered population. Hence, our efforts to address representivity run up against an additional selection problem. The (desired) answer to the question is explicitly driven by selection in the type of person who registers under each channel and treatment, but our ability to conduct demographic analysis is restricted to registered users who answered these questions, causing a second (undesired) form of selection. We must therefore approach these results recognizing that we are examining the representivity of those who both use a channel *and provide data*, and this does not necessarily reflect the representivity of the channel's users as a whole.

Given this caveat, Table 2 shows that different platforms clearly generate user groups with radically different gender and racial compositions. While the population of the country is just less than half female, almost two thirds of the USSD users were women. In sharp contrast, almost two thirds of the MXIT sample was male. The USSD group was also more black (94 percent) than the national population (79 percent), while the Twitter/Gtalk group was less so (60 percent). Mobi, building off of social networks that focus on relationships and sexual health, is equally black and female but has an average age almost three years younger than the USSD channels. The MXIT group, in contrast, was more coloured (14 percent) and male (62 percent) than the general

population. Voting in the 2009 elections is everywhere much lower than the actual turnout rate in 2009, most likely due to the fact that a large share of our users were not of voting age in 2009, and indeed the MXIT platform with the youngest average age also has a low reported 2009 voting rate. Within the USSD group, the demographic profiles of the standard, free, and lottery groups were mostly similar; the lottery group was slightly older and slightly less black.

Thus, our USSD sample was more likely to be black and female, while the MXIT sample was younger, and more male and coloured. These sharp distinctions across platform in an otherwise comparable ICT/DM approach show that the recruitment channel has an enormous influence over the composition of users, suggesting that we cannot speak in any straightforward way about the general effect of technology on participation. Different technologies draw in and promote participation for different groups of people.[15]

How does the demographic data alter analysis of participation across channels? We can consider the effects of demography on our study by examining how the presence of, and controlling for, demographic variables might otherwise alter our interpretation of participation across channels. To do this, Table 3 examines the extent of participation across phases by channel, beginning with the number of pre-election phase 2 responses (other than the demographics themselves), the decision to volunteer in phase 3, and the number of post-election phase 4 responses. The regressions include exhaustive dummies for each of the major channels and do not include a constant so that the coefficient reported for each channel in the first four rows is the sample mean for that channel. For each outcome we begin with a simple observational analysis of the intensity of participation across channels. We then estimate the same regression, using only the sample for whom demographic data are available. We repeat the regression controlling for demographics and the initial engagement question, taking the mean off of the demographic variable so that the channel-specific averages are for a constant average individual with cross-specific variation in demographics removed.

[15] Because the channels deliver samples that lie on both sides of the national averages for race, gender, and age, outcomes across channels could be reweighted to produce simulated national estimates, in principle. For only one variable (voted in 2009), do all platforms demonstrate lower turnout (primarily as a result of the age composition of our sample with many individuals between 18 and 23), and so here we would have to reweight the samples within each channel by age to achieve an unbiased prediction.

Table 3 shows that older people and those who expressed more engagement in the election participate at higher rates in all categories. Women participate more in online forms of engagement, but do not volunteer to serve as COs at a higher rate. The sample that provided demographic data gives 1.5 to 2 times as many other Phase 2 and Phase 4 responses, and among USSD users those giving demographics are twice as likely to volunteer to undertake real costs in Phase 3. However, understanding the demographics of these groups does not materially change our conclusions about participation across channels: controlling for age, gender, race, and past voting has almost no effect on the cross-channel differences. Within this high-engagement sample, our results indicate that the differences across platforms do not arise primarily from the demographic profiles of the participants.

4.3. Geographic Representativeness of Participation

To recruit citizen monitors, we are not concerned with the representativeness of individuals themselves, but we do care about selection in the types of polling place where the platform recruits monitors. To examine this, we calculate local averages of demographic and technology-related factors for the 4,276 Wards in South Africa, and use these to explain the fraction of polling stations in each ward where we had volunteer monitors. An obvious attraction of an ICT/DM-driven approach is its allowance for tremendous geographic reach, particularly salient in certain applications – like election monitoring – where the goal requires geographic coverage rather than demographic representativeness. International election observers typically do not visit all areas of a country during an election, with predictable biases in the types of locations they monitor (Simpser 2008). ICT/DM crowdsourcing of election data offers a complimentary source of data with a broader geographic reach.

Table 4 presents results of this analysis. We examine the reach of ICT/DM-driven approaches in steps, first examining two of the primitive infrastructural requirements for our platform to function: access to a mobile phone and internet (including from a feature/smartphone). Column 1 shows that 89% of households in the country have mobile phones, and that phone penetration is highest in places that are educated, electrified, and majority black or coloured. The determinants of internet access are broadly similar,

suggesting that our platform is technologically enabled in places that are less likely to vote ANC than the national average. Turning to our success at recruiting volunteer COs (the only place in the study at which we can locate our participants in space), on average we recruited volunteer COs in 12 percent of polling stations nationwide. We had at least one monitorable station in 38 percent of the wards in the country. We had more success recruiting volunteer COs in wards with high mobile phone penetration and education levels and more male populations. We also had greater success in wards with a greater fraction of coloured citizens, and in areas with higher ANC vote share in 2009, and, somewhat surprisingly, areas with fewer computers. Support for the DA (which correlates strongly with non-black voters) reduced our chances of recruiting a volunteer CO.

Thus, wards likely to produce a volunteer CO had more phones, fewer computers, a somewhat more educated, male, and non-white population than average. On the one hand, this is encouraging because it suggests that our cell phone wielding COs did not hail only or primarily from white suburbs. On the other hand, the correlation with ANC vote share suggests a potentially problematic feature of citizen monitoring: this modality requires individuals to undertake the risk of actually monitoring a station. To the extent that monitoring electorally uncompetitive and/or less unstable areas proves less risky, a crowdsourcing approach may result in data skewed toward districts where little out of the ordinary happens, i.e. locations that are perhaps the least important to monitor. Hence the intersection of citizen incentives and politician strategy may mean that the most problematic polling places are precisely those in which citizen monitoring is least likely to occur.

4.4. Data Captured through the Platform

Given the severe selection present in our final respondent sample, does the system gather data that provide a useful window into the outcomes social scientists care about most? We now provide an overview of the quality of the data gathered by the system. We focus on only a few outcomes (a detailed analysis of these data and their reliability relative to other sources is the subject of a companion paper) and emphasize outcomes for which the election itself gives us an objective measure of national-level behavior.

One promising feature of communicating through ICT/DM involves the ability to conduct continuous real-time political polling. Figure 2 plots the results of the 'Push' questions sent to individuals on randomized days, with some surveys performed on every day between the launching of the platform and several weeks after the election. The results of our opinion polling are consistent across time, displaying relatively slight variation around the (dotted) smoothed trendline, and evidencing a swing towards the victor (ANC) after the election is over. Our sample over-represents ANC support and strongly under-represents DA support; the smoothed polling support on the day of the election is 69.8% and 12.9% for the ANC and DA, respectively, while the actual election outcome was 62.1% and 22.2%. However, because ANC support strongly varies by channel and these technology-specific averages lie on both sides of the national average (mid-70s on the USSD channels, 61% on Mobi, 57% on MXIT, and 17% on Twitter/Gtalk), we can reweight our sample across platforms to predict election day vote totals exactly and then examine the temporal variation in this reweighted average.

Table 5 shows data across five outcomes: the fraction reporting election-related violence in their community, the fraction supporting the ANC and DA, the outcome of election monitoring on whether the tally sheet was posted, and self-reported turnout. Panel A examines the whole sample and Panel B only the sample that we could geo-locate and hence ascribe to a specific polling place.[16] 34% of communities for which we have reports suffer some sort of election violence, but only 10% of individuals report on this outcome and we only have geo-located violence data for about 1% of the polling places in the country. Columns 2 and 3 show the same information from Figure 2 presented in a different way, again making clear the under-representation of the DA on our platform. Column 4 shows tally sheets posted in 78% of the monitored stations, but again severe attrition in the product of geolocation and responses to the Phase 3 questions give us just one half of one percent of the stations in the country with valid responses to this question. Finally, Column 5 examines self-reported turnout. Whether because of self-reporting bias or because of the selection of highly politically engaged individuals into our platform, we see turnout rates in excess of 90% while the correct national figure is

[16] To try to mimic the national data as well as possible, support for the ANC and DA is measured only among those who told us that they intended to vote in the Engagement question, and the 'turnout' variable is calculated only among those who told us that they were registered to vote.

72%. Hence, we cannot reweight our data across channels to recover the correct average national turnout rate. In summary, the users of our platform are stronger ANC supporters and are more likely to report voting than the national rates.

5. Testing Hypotheses on Political Participation

We next evaluate hypotheses about how costs, benefits, technology, and predispositions toward political participation shape engagement.

H1a: Participation in the absence of extrinsic incentives will be non-zero.
H1b: Participation will increase with the use of extrinsic incentives.
H1c: Participation will respond more strongly to lotteries than to small expected value transfers.

The original PCM recruitment experiment randomly assigned people to standard texting rates, free texting, or lottery incentives to participate. The standard rates treatment offered no financial incentive to join. In contrast, both the free or lottery treatments offered an incentive. We expect a positive level of participation in the standard arm (H1a), but anticipate it will be higher in no cost and lottery treatment arms (H1b).

We also anticipate that the cost and lottery treatments may affect participation in different ways (H1c). Both are forms of extrinsic reward, and we expect both to increase participation relative to the "standard" USSD treatment (barring net crowd-out). However, the free treatment offered a certain cost reduction (R0.2 per USSD session) while the lottery treatment offered a probabilistic reward of R55, where participants did not know the probability itself. For the lottery treatment to supersede the free treatment in expected value, agents would have to assume a relatively high probability of lottery payout (greater than 1 in 275). As this is arguably an unrealistic assumption for most real world lotteries, a strictly rational agent might respond more to the offer of free service. On the other hand, R0.2 (about 1.5 US cents) is a trivial amount, even for relatively poor participants. Moreover, many prior studies in behavioral economics have shown that agents tend to over-weight small probabilities (Kahneman and Tversky 1979, Camerer 2004). For these reasons, a lottery, even or especially one without the odds given, may have a stronger impact on behavior.

Comparing the USSD Standard, Free, and Lottery columns of Table 1 'Recruitment and Participation Numbers', we see that 1 in every 1900 PCMS without an incentive attached resulted in a registered user. Thus, it does appear that some fraction of the population will participate without incentives, supporting H1a. Incentives are nonetheless effective; the yield rate jumps to 1 in every 1111 PCMs when some kind of incentive (free service or the lottery) is offered, supporting H1b.

A similar pattern prevails for the CO volunteer experiment in Phase 3, which randomized incentives (R5 or R55) to join (see Table 6). We conducted this experiment on 41,863 people. In the absence of incentives, 3.4 percent of the Standard USSD users invited to serve as COs volunteered (approximately 1600 people). We emphasize that R5 is a very small sum of money and the literature generally suggests that net crowd-out of intrinsic incentives will be particularly strong when extrinsic incentives are minimal (Gneezy and Rustichini 2000). Incentives bumped up participation by close to 2 percentage points (significant at the .01 level), nearly 900 people.

Actual monitoring also responded to incentives (see Table 7). When offered the payment of R5, only 12 percent (or 232 people) of those deployed to monitor entered any data on their polling places. In contrast, among those offered the more substantial payment of R55, this rate almost doubled to 21.9 percent (433 people). Within the sample that monitored, the rate of successful entry of ANC voting data via SMS almost tripled, from 4.2 to 14.6 percent for those offered the larger incentive.[17] We also do not control for entry strata as virtually all of the actual monitors came from the standard USSD treatment group.

While our data unambiguously show the effectiveness of incentives, we are struck more by the evidence suggesting substantial numbers of intrinsic participators. Many of our participants were relatively poor people using the most basic cellular technology. Yet a substantial number were willing to participate in all stages of our platform without incentives of any kind, in many cases paying the full cost of submitting information. Our platform was built from scratch, without the backing of an on the ground organizational presence. We offered little feedback to participants and zero face-to-face interaction. The

[17] We do not control for demographics in this table because of data limitations. However, 100 percent of COs who provided demographic data were black.

willingness of South Africans to engage with such a system, providing information about themselves and their political environment, and even in some cases volunteering to serve and actually serving as citizen election observers, highlights the importance of intrinsic motivations to participation.

We next evaluate whether reducing the cost of an activity has a different effect than increasing the benefit of it by exploring the different impacts of the "free" USSD treatment versus the "lottery" USSD treatment. Referring back to Table 1, initial registration rates in the free group were not higher than rates for the standard group. If anything, they were slightly lower. This result is surprising given the socioeconomic profile of most of our participants: we expected this population of relatively poor, primarily black youth to be sensitive to the cost of service. Apparently, participation is not especially constrained by telecommunications costs. In contrast, the lottery treatment yielded registration that was 2.4 times higher than the other groups. The result is most consistent with people irrationally motivated by lotteries due to overweighting of small probabilities.

Hypothesis 2: More user-friendly technology (MXIT) will select in less politically motivated and committed engagers than less user-friendly technology (USSD).

Having shown that users of channels differ demographically, we now test for attitudinal differences across channels. The USSD interface was clumsier and harder to use than any of the social media platforms. In contrast, MXIT (and particularly Mobi) users had a low-cost entry to the digital environment. USSD thus required more motivation on the part of its users than their MXIT counterparts to participate. If cost formed the only difference between platforms, we would therefore expect that USSD – and especially the standard cost USSD – pulled in more enthusiastic and committed engagers than MXIT (H2).

To evaluate this, we look at answers to the engagement question across different technology channels. The engagement question asked participants if they think their vote matters. We consider participants who answered with an optimistic "yes, every vote matters!" as those most inclined toward engagement, and respondents who did not feel their vote mattered and those not registered least inclined toward engagement. We find

that MXIT participants were substantially less likely than the USSD group to fall in the enthusiastic camp (Table 8). However, contrary to our theory, Mobi users are substantially more likely to express enthusiasm for the political process. Further, we do not find the expected differences across USSD arms: participants in the lottery group appear more engaged and less disaffected than both the standard and free groups. Given that engagement does not monotonically line up with costs in the way our theory predicts, this suggests that there may be underlying differences in the intrinsic motivation η across channels *j*, with Mobi in particular drawing in a group of participants that report being highly engaged in the electoral process.

H3: Participation will fall as individuals are asked to undertake actions with higher costs.

H3a. This decay in participation as costs increase occurs among the least engaged individuals.

H3b. Declines in participation over time occur among the least engaged individuals.

Early stages of this project involved simple and relatively costless tasks like answering an engagement question and signing a brief Terms and Conditions statement. Stage 2 continued with more intensive but still completely digital forms of engagement, answering anonymous survey questions. Stage 3 represented a departure into more costly forms of real world participation: CO volunteers provided personal information about their geographic location and signaled their willingness to serve as a citizen observer. Those who actually deployed engaged in the costly action of returning to their polling station the day after the election to enter detailed information about the presence and content of the tally sheet. We anticipate that participation should decay as tasks shift from easy, low cost, and digital forms to harder, higher cost, real world forms of engagement. At the same time, we do not expect participation to decay constantly across all participants. As noted, participants vary in their innate underlying inclination to engage in political action. Those with higher predispositions to engage should be more likely to continue participating in the platform even as the costs increase. In contrast, those with weak predispositions to engage should respond more acutely to increasing costs.

To capture underlying predispositions towards engagement, we exploit the selection effects generated by the different technology channels. Because digital engagement through MXIT and Mobi proved easier than through USSD, we expect these platforms to have pulled in participants disproportionally more likely to drop off the platform as we shifted from digital to real world engagement (H3a). Our results confirm this intuition (Figure 3). Across all technology channels, participation was lower in Phase 3, as expected. However, the decline in participation appears steeper for the (dashed) social media participants who faced lower initial barriers to enrollment in the platform than for the (solid) USSD participants. We do not believe this effect is simply due to time, as MXIT users return to participation in Phase 4 after the election. Like Phase 2, Phase 4 involved digital, not real world, engagement.

Looking back at Table 3, we can evaluate this point more systematically. MXIT generates a much higher number of Phase 2 responses than any other platform, but has a lower fraction of users volunteering in Phase 3 and less than a third as many users responding in Phase 4 compared to USSD. This remains true even controlling for demographic factors (age, gender, and race). Thus, MXIT users participated more extensively when participation involved only digital engagement; otherwise, their commitment proved more brittle than USSD users with real world action.

We also explore the relationship between attitudes toward participation and attrition over the course of time by looking at answers to the engagement question across rounds (H3b). Table 9 presents these results. We split the answers into two different dimensions: first, *'does my vote matter'* (consisting only of the group that answered "Yes, every vote matters") and second, *'will I vote'* (including the "No but I'll Vote Anyway" group). Understanding what kinds of real world engagement relate to digital engagement, the "No but I'll Vote Anyway" group plays an important discriminating role identifying people disengaged in terms of enthusiasm but nonetheless planning on voting.

Table 9 shows that the perception of 'does my vote matter' does not have any strong relationship with subsequent participation. Those who respond 'Yes, every vote matters' versus 'No but I'll vote anyway' respond at relatively similar rates to all phases of the study. The second dimension, however, which is 'will I vote', strongly predicts the willingness to volunteer to monitor and respond to post-election questions. These two

groups respond at similar rates to registration and Phase 2 questions as those who will not vote, but volunteer to monitor at rates 3-4 times higher as those who say they do not intend to vote. Post-election response rates remain twice as high for the group that intended to vote as the group that did not.

These results provide important linkages between 'participation' in the virtual world and in real political activity. Engagement in the election does not predict digital participation when costs are low, but becomes strongly predictive once use the digital platform to recruit real-world engagement. This relationship, arising from observational and not experimental data, offers a number of interpretations. For example, perhaps individuals always intending to vote face lower monitoring costs of their polling place, or perhaps common factors such as proximity to polling places drive them both. Nonetheless, the monitoring activity was to take place the day *after* the election, requiring a return visit to the polling place whether or not one had voted. Hence voting intentions does not directly reverse-cause willingness to monitor, and our results accord with the idea that those with high initial engagement are the most likely to remain involved as the costs involved in political actions move into the real world.

H4a: Differential response rates on incentivized versus un-incentivized actions will be larger for the group given extrinsic incentives at recruitment.
H4b: The differential response to later incentives for the initially extrinsically motivated group will disappear as individuals are asked to undertake actions with high costs.
H4c: Appeals to extrinsic factors such as visibility of political activity will be more effective in the group initially given extrinsic incentives.

We expect that the marginal effect of incentives will be stronger in the extrinsically motivated group in recruitment since this sample includes people who perform actions if paid. This implies a difference in differences: the effect of incentivitization should be larger for those who have already shown sensitivity to incentives.

Because the Lottery treatment was clearly effective at inducing participation, we focus our attention on this arm unequivocally more composed of extrinsically motivated individuals than the Standard arm. The lack of overall selection in the Free arm means

that there are no obvious differences in the degree of extrinsic motivation (although the composition could have changed towards extrinsic motivation, with some intrinsic individuals dissuaded and the overall numbers unchanged).

To test H4a, we exploit the fact that some phase 2 questions were incentivized via lottery for all participants (the 'Demographics' questions) while others were un-incentivized for all participants (What's up, VIP). We can look at the differential response rates to these two sets of questions for initially incentivized (Free and Lottery) and un-incentivized (Standard) groups to understand how recruitment incentives alter the differential efficacy of subsequent incentives. We expect the differential participation rate between incentivized and un-incentivized questions will be larger in the group that was recruited using extrinsic incentives than the group that was not.

Column (1) of Table 10 shows that the Free and Lottery groups are about 8 percentage points more likely than the Standard group to answer incentivized questions. Column (2) shows that the difference in the willingness to answer un-incentivized questions is either zero or very small relative to Standard. Consequently, when in Column (3) we show the difference in differences between incentivized and un-incentivized questions, both incentive treatments result in differential response rates under incentives on the order of 6.7 pp (Free) to 8.4 pp (Lottery), confirming H4a.

Column (4), Table 10 tests H4b, moving from responses to survey questions (a low-cost act) to entering all the location data required to identify an individual's polling place, signing terms and conditions, and volunteering to monitor (a high-cost act). The lottery incentive in the two arms is the same, and so assuming that the total cost of the process to recruit observers is substantially in excess of this amount then we will have $c_{j2} > c_{j1} + (\beta_{j2} - \beta_{j1})$, thus $\frac{d\rho_{j2}}{d\beta_{j2}} = \frac{1}{\bar{\eta}}$ in both groups and there should be no differential effect. As predicted, in this case with large costs the incentive is strongly effective in all three groups and not differentially so across initial recruitment arms. Table 6 shows the monitoring enrollment numbers across the initial PCM incentive experiment. Our theory predicts that the initial lottery incentives would have a detrimental effect on subsequent monitoring participation rates in the absence of incentives, but the opposite proves true. This suggests that a potential negative side-effect of using enrollment incentives

(unwillingness to do things subsequently unless incentivized) does not manifest itself in our sample. In this sense our evidence is doubly positive on the use of enrollment incentives (higher overall subsequent participation plus higher subsequent responsiveness to extrinsic incentives).

Finally, Columns (5) and (6) in Table 10 test H4c returning to the domain of digital engagement and examining how the incentivized and un-incentivized groups responded to different GOTV treatments. The GOTV exercise sent a message to people prior to the election telling them to vote, as well as providing a randomized reason to do so. The two treatments were: 'Voice', in which citizens were urged to make their voices heard, and 'Visibility' in which they were also reminded that their neighbors would be able to tell whether they voted by their inked fingers. We take the 'Voice' treatment as an intrinsic one, and the 'Visibility' treatment as extrinsic, and expect the 'Visibility' GOTV treatment will have a stronger effect in the group induced to enter by incentives (Lottery, Free) and the 'Voice' GOTV treatment will have a stronger effect in the group intrinsically motivated in the first place (Control). The outcome variable is a dummy indicating that they responded when we asked them the question 'did you vote?' (5), and a dummy for 'I voted' (6). We can use the cross-randomized experiments of initial incentives and 'extrinsic' or 'intrinsic' GOTV messages to examine differential response rates.

Interestingly, neither the intrinsic nor extrinsic message, nor the interactions with PCM treatment, had any effect on the probability that individuals respond to the GOTV question. The responses, however, strongly correlate with treatment status: both the Free and Lottery arms are significantly more likely than the Standard PCM arm to report having voted. The 'intrinsic' message is strongly significant, increasing the probability that individuals report having voted by more than 8 percentage points (off of a control mean of 86.4%). Column (6) provides some confirmation for H4c; the intrinsic cue of emphasizing 'voice' improves voting overall, while the effect is near zero for groups that got the extrinsic financial incentives to enroll. While participants overall responded negatively to the 'Visibility' GOTV treatment, the disproportionately extrinsically motivated 'Lottery' group has the highest participation under this treatment. We do not

find significant evidence that the control responded more strongly to the intrinsic 'Voice' GOTV treatment.

Overall, we find a fair amount of support for the idea that, by initially incentivizing a voluntary activity, we create a participant group that subsequently responds more favorably to incentives. Incentivization creates a positive feedback loop for itself.

6. Conclusion

This paper presents the results from a nationally scaled ICT/DM election platform that we built de novo using modern methods to advertise and recruit participants across a variety of cellular and digital channels. 90% of our final users come through MXIT, a feature and smartphone social media site, and basic mobile phone users interacting via menu-driven USSD interface. Users vary across a number of dimensions, explained by a simple model of the economic benefits of participating (extrinsic inducements to participate, the effect of past incentives on the marginal incentives in a given user group) as well as ones that are less straightforward (how the intrinsic incentives to participate vary across user group and across political action). Our study attempts to shed light on the ways in which digital participation interacts with engagement in real-world political activity

At a simple observational level, we confirm that those who intended to vote in the election at the time of registration are more likely to remain involved in our platform during the course of the electoral cycle, particularly as they are asked to engage in election-related activities with real-world costs. Smartphone-based platforms make digital communications easy and help to retain participants for activities such as entering information about themselves and local political events, but they also recruit a user base that is particularly prone to attrite when asked to undertake more costly political actions. Overall, digital participation is highly correlated with real-world participation.

Our experimental results provide insights important policy implications for actors concerned with improving democracy and governance in developing countries. First, intrinsic and extrinsic motives drive participation. Contrary to a literature suggesting that small extrinsic incentives may crowd out intrinsic motivation, we find relatively small

financial inducements to be effective at every stage in the platform. This is particularly true of lotteries. Our results suggest a set of dynamic benefits of the initial use of incentives: the subsequent user group is larger in absolute size, is no more recalcitrant when asked to do things for free, and is more responsive to incentives on the margin. The incentive to monitor tripled the probability that an individual entered usable voting data from their polling station. We therefore see little downside to these incentives in our data.

Second, the results of our platform help inform discussions within the ICT/DM community about the implications of the choice of technology channels. The starkly different demographic profiles of users across channels suggests that there is no simple answer to the question "Can technology improve participation by under-represented groups"; rather the relevant question is "Which blend of technologies will yield the final user profile that we want". Our user demographics map in a fairly straightforward way onto the technological platform, and we discuss the outcomes for which a reweighting scheme could recover correct national averages (ANC support) versus those which it could not (voter turnout, for which all platforms display voting levels higher than the national rate).

Third, our results provide information on the practical possibility of using citizens as election monitors and whistleblowers for political acts such as vote-buying or campaign violence. ICT/DM can prove a useful tool for organizations that are already interacting with constituents in a wide variety of ways, including in health, banking, and agricultural sectors. But citizen participation has been a stumbling block in numerous ICT/DM applications to date, most notably those that require action rather than simply passive absorption of information. We provide evidence on strategies to encourage citizen engagement in some very real-world political activities, including monitoring polling places. We provide large numbers of reports of vote-buying and electoral violence in a very large number of different locations, suggesting that the crowdsourcing platform can provide a meaningful way of understanding political events that would otherwise be difficult to observe.

The ICT/DM monitoring delivers a large absolute number of polling places with volunteer monitors, but the quality of the actual monitoring data is low. This signals a meaningful potential change in citizen engagement in the election, but questions whether

ICT-enabled citizens can provide a useful way of gleaning vote tallies from a large number of polling places. The quality of the voting data recovered through the system is poor overall. We note that as a part of separate election-monitoring experiment, we provided some training to a group of college students and asked them to use the VIP:Voice platform to monitor a specific set of polling places. These slightly-trained individuals were paid 200 Rand and achieved a 90% success rate at monitoring polling places, suggesting that a very light-touch intervention combined with an ICT platform can achieve widespread monitoring at low cost.

Ultimately, the transformative potential of ICT/DM depends on how citizens use technology. We show that with the appropriate choice of channel, an ICT/DM approach can achieve outreach far beyond the young male demographic that may dominate smartphone-based social media, broadening participation further using extrinsic incentives. Political engagement that is initiated in the digital realm can cross over to activity in the real world. ICT/DM can therefore play a central role increasing citizens' participation and their contribution to the quality of democracy in countries across the developing world.

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TABLES.

Table 1. Recruitment and Participation Numbers

	Mobile Phone Channels:				Feature Phone	Smartphone/ Social Media Channels:			
	Mobile Phone PCM Experiment:								
Phase 1 Recruitment.	USSD Standard	USSD Free	USSD Lottery	USSD Non-Experimental	MXIT	Mobi	Twitter/ Gtalk	Advertising/ Other	Total
Total # Solicited via PCM	13.8m	16.1m	19.9m		.	.	.	.	.
Total # Registered	7,257	8,146	24,762	4,277	40,416	4847	101	840	90,646
Registered as % of PCMs	0.0526%	0.0506%	0.1244%						
Phase 2 Participation Waterfall.									
Any Initiation	23,548	29,997	73,102	12,999	114,358	4,923	317	3,735	262,979
Any answer to Engagement Question	11,283	14,955	39,143	6,816	55,352	4,882	131	1,485	134,047
Registration (T&C) Initiated	9,077	11,558	31,413	5,426	50,862	4,867	119	1,136	114,458
Registration Completed	**7,257**	**8,146**	**24,762**	**4,277**	**40,416**	**4,847**	**101**	**840**	**90,646**
Registration & Demographics Completed	1,581	2,342	7,415	1,143	20,078	2,019	66	74	34,718
Reg, Demo, and Any Other Phase 2	565	853	2,441	367	10,215	995	23	2	15,461
Registered + Demography as % of Initiated:	6.714%	7.807%	10.143%	8.793%	17.56%	41.01%	20.820%	1.98%	13.20%
Registered + Demography as % of PCMs:	0.011%	0.015%	0.037%						
Phase 3 Monitoring Invitations.									
Invited to Volunteer as Monitor	5,441	7,023	22,176	3,805	2,635	766	16	1	41,863
Agreed & Provided All Relevant Information	285	361	1,126	212	462	47	5	0	2,498
Potential Monitors as % of Invited:	5.24%	5.14%	5.08%	5.57%	17.53%	6.14%	31.25%	0.00%	5.97%
Phase 3 Actual Monitoring.									
Asked to Monitor	1,771	3	6	49	1	5	0	28	1,863
Conducted Any Monitoring	311	3	1	8	1	0	0	8	332
Monitors as % of Actually Asked:	17.56%	100.00%	16.67%	16.33%	100.00%	0.00%	NA	28.57%	17.82%
Phase 4 Participation.									
Invited to Participate in Phase 4	5,711	7,826	23,964	4,043	35,370	72	78	814	77,878
Respond to GOTV questions	531	684	2,099	352	1,365	7	0	0	5,038
Respond to Voter Experience Survey	1,301	91	4,185	636	740	24	1	0	6,978
Voter Experience as % of Phase 4:	22.78%	1.16%	17.46%	15.73%	2.09%	33.33%	1.28%	0.00%	8.96%

Table 2: Demographics of Participants, by Platform

	Age	Male	Black	Coloured	Asian	White	Voted in 2009
National Average	**24.9**	**0.51**	**0.792**	**0.0892**	**0.0249**	**0.0886**	**77.30%**
USSD Standard	25.065	0.352	0.942	0.032	0.008	0.002	52.95%
SE	7.74	0.48	0.23	0.18	0.09	0.05	0.50
USSD Free	25.875	0.343	0.938	0.038	0.009	0.009	51.63%
SE	7.82	0.47	0.24	0.19	0.09	0.09	0.50
USSD Lottery	26.356	0.353	0.936	0.043	0.009	0.005	59.68%
SE	7.86	0.48	0.24	0.20	0.09	0.07	0.49
USSD Other	26.820	0.348	0.939	0.032	0.015	0.001	59.73%
SE	8.47	0.48	0.24	0.18	0.12	0.03	0.49
MXIT	22.761	0.622	0.816	0.137	0.023	0.013	28.15%
SE	5.92	0.48	0.39	0.34	0.15	0.11	0.450
Mobi	23.715	0.347	0.891	0.055	0.016	0.007	46.62%
SE	6.68	0.48	0.31	0.23	0.12	0.09	0.50
Twitter/GTalk	25.453	0.485	0.639	0.098	0.131	0.115	40.6%
SE	5.98	0.50	0.48	0.30	0.34	0.32	0.50

National average data comes from the 2011 South African Census. Remaining cells give the averages among the sample that entered under each platform/status *and* answered the demographic questions in the platform. First row gives the means and the second row the standard error of the outcome for each stratum.

Table 3: Participation, Controlling for Demographics

Outcome:	Number of Phase 2 Responses (other than Demographics)			Volunteers to Monitor in Phase 3			Number of Phase 4 Responses		
Sample:	All	Demographic Data Observed		Volunteer Recruitment Sample	Volunteer Recruitment Sample, Demographic Data Observed		All	Demographic Data Observed	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
USSD	0.530***	1.727***	1.620***	0.0505***	0.104***	0.0866***	0.801***	1.436***	1.313***
	(0.01)	(0.04)	(0.05)	(0.00)	(0.00)	(0.00)	(0.01)	(0.03)	(0.03)
MXIT	3.366***	6.372***	6.446***	0.0486***	0.0490***	0.0607***	0.250***	0.419***	0.485***
	(0.03)	(0.05)	(0.06)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)
Mobi	0.255***	3.695***	3.591***	0.0535***	0.448***	0.434***	0.0332***	1.661***	1.592***
	(0.01)	(0.77)	(0.77)	(0.01)	(0.09)	(0.09)	(0.01)	(0.39)	(0.39)
Other (Twitter, Gtalk)	0.372***	2.966***	2.898***	0.235**	0.250**	0.253**	0.00956	0	-0.0464*
	(0.07)	(0.57)	(0.57)	(0.10)	(0.11)	(0.11)	(0.01)	0.00	(0.02)
Age			0.0189***			0.00257***			0.0177***
			(0.01)			(0.00)			(0.00)
Male			-0.700***			-0.00163			-0.0888***
			(0.08)			(0.01)			(0.03)
Coloured			0.294**			-0.0281***			-0.155***
			(0.14)			(0.01)			(0.03)
White			0.148			-0.0602***			-0.215***
			(0.30)			(0.02)			(0.07)
Asian			-0.501			-0.0416			-0.195**
			(0.41)			(0.03)			(0.10)
Voted in 2009 Election			-0.397***			0.00911			0.170***
			(0.08)			(0.01)			(0.03)
Engagement: too young to vote			-0.374***			-0.0209***			-0.0308
			(0.13)			(0.01)			(0.03)
Engagement: Enthusiasm			0.0920*			0.0244***			0.0949***
			(0.06)			(0.00)			(0.01)
Observations	90,646	28,747	28,747	41,863	9,749	9,749	90,646	28,747	28,747
R-squared	0.217	0.405	0.407	0.051	0.102	0.112	0.11	0.16	0.167

OLS regression with robust standard errors. *** p<0.01, ** p<0.05, * p<0.1. Colums 1-3 and 7-9 use the entire registered sample, while columns 4-6 use the entire sample invited to serve as Citizen Observers. Regressions include an exhaustive set of dummies for channel and no constant, so the coefficients in the first four rows give the average unconditional outcome in each cell. Individual covarieates are demeaned before interaction, so the coefficients on channels in columsn 3, 6, and 9 give the outcome for a constant average individual type.

Table 4: Determinants of Successful Recruitment of Citizen Monitor at Ward Level

	ICT Coverage from National Census Data		From VIP:Voice
	Fraction of HHs with Mobile Phone	Fraction with Internet Access in the Home	Fraction of Polling Places with Volunteer CO
	(1)	(2)	(3)
Fraction w/ Mobile Phone			0.506***
			(0.073)
Frac w/ Internet Access			0.020
			(0.060)
ANC Vote Share in 2009	-0.022***	-0.044***	0.053**
	(0.005)	(0.006)	(0.021)
DA Vote Share in 2009	0.028***	-0.035***	-0.099**
	(0.009)	(0.010)	(0.040)
Pop ('000)	-0.001**	-0.004**	0.001
	(0.000)	(0.000)	(0.002)
Pop under 25 ('000)	0.006***	0.013***	0.003
	(0.001)	(0.001)	(0.006)
Fraction Male	0.202***	0.030***	0.149*
	(0.019)	(0.021)	(0.078)
Frac Black	0.124***	0.084***	-0.011
	(0.009)	(0.010)	(0.040)
Frac Coloured	0.024***	0.053***	0.068**
	(0.006)	(0.008)	(0.031)
Frac English Speaking	0.002	0.091	-0.064**
	(0.005)	(0.008)	(0.031)
Frac w/ HS Diploma	0.258***	0.211***	0.134**
	(0.011)	(0.015)	(0.060)
Frac w/ Electricity	0.083***	-0.001***	-0.035
	(0.005)	(0.004)	(0.023)
Frac w/ Computers	0.059*	0.518*	-0.185***
	(0.014)	(0.016)	(0.072)
Constant	0.514***	0.012***	-0.397***
	(0.012)	(0.014)	(0.064)
Number of observations	4,276	4,276	4,276
Mean of Dep Var:	0.888	0.248	0.134

OLS regressions using 2011 Census data on all wards in South Africa, weighted by ward-level population to be nationally representative. note: *** p<0.01, ** p<0.05, * p<0.1

Table 5: Outcomes from VIP:Voice Surveys

	Phase 2 Outcomes			Phase 3	Phase 4
Panel A. All Registered.	**Community Violence**	**ANC vote share**	**DA Vote Share**	**Was Tally Sheet Posted?**	**Self-Reported Turnout**
	(1)	(2)	(3)	(4)	(5)
% Registered Reporting	10.03%	7.84%	7.84%	0.37%	4.80%
Outcome among All Registered	0.34	**0.63**	**0.14**	0.78	**0.93**
SE	0.47	0.48	0.35	0.41	0.25
Panel B. Registered & Geolocated					
% Polling Places w/ Reporting	0.921%	0.921%	0.921%	0.058%	2.230%
Outcome among Geolocated	0.26	**0.65**	**0.13**	0.85	**0.97**
SE	0.44	0.48	0.34	0.38	0.18
Panel C. Actual.					
National Election Outcome		**0.62**	**0.22**		**0.72**

Means and Standard Errors in the indicated samples. Panels A and B from the VIP:Voice Data; Columns (2) and (3) calculated among VIP:Voice users who said they intended to vote, and Column (5) among users who said they were registered to vote. Panel C gives 2014 election results from the IEC.

Table 6. Impact of Incentives on Volunteering to Observe

	Volunteers to Monitor in Phase 3		
	All	All w/ Demographics	
	(1)	(2)	(3)
Incentivized to Monitor	0.0198***	0.0322***	0.0327***
	(0.00)	(0.01)	(0.01)
USSD Free	0.0111***	0.0439***	0.0416***
	(0.00)	(0.01)	(0.01)
USSD Lottery	0.00637*	0.0135	0.00781
	(0.00)	(0.01)	(0.01)
USSD non-experimental	0.00979**	0.0275*	0.0193
	(0.00)	(0.02)	(0.02)
MXIT	0.00464	-0.0373***	-0.0207*
	(0.01)	(0.01)	(0.01)
Mobi	0.00915	0.351***	0.351***
	(0.01)	(0.09)	(0.09)
Twitter/Gtalk/Other	0.191*	0.164	0.184*
	(0.10)	(0.11)	(0.11)
Age			0.00287***
			(0.00)
Male			-0.00171
			(0.01)
Coloured			-0.0280***
			(0.01)
White			-0.0612***
			(0.02)
Asian			-0.0392
			(0.03)
Voted in 2009 Election			0.0162**
			(0.01)
Constant (average in USSD Standard)	0.0340***	0.0697***	-0.00861
	(0.00)	(0.01)	(0.01)
Observations	41,863	9,749	9,749
R-squared	0.003	0.017	0.025

OLS regressions with robust Standard Errors, regression estimated within the sample sent invitations to volunteer as Citizen Observers. *** p<0.01, ** p<0.05, * p<0.1

Table 7: Impact of Incentives on Actual Citizen Observing

	Monitoring performed	Entered usable Vote data, whole sample	Entered usable Vote data, among those who responded
	(1)	(2)	(3)
Incentivized to Monitor	0.099***	0.027***	0.104***
	(0.017)	(0.006)	(0.031)
Outcome in Unincentivized Group	0.120***	0.005**	0.042**
	(0.012)	(0.003)	(0.020)
Number of observations	1,829	1,829	322

OLS regressions with robust Standard Errors, regression estimated within the sample actually invited to serve as Citizen Observers. *** p<0.01, ** p<0.05, * p<0.1

Table 8: Channels and Engagement

	Answer to Engagement question: "It's election time! Do u think ur vote matters?"				
	Yes, every vote matters	No, but I'll vote anyway	No so I'm not voting	Not Registered	Too Young
	(1)	(2)	(3)	(4)	(5)
USSD Standard	63.58%	8.82%	2.74%	14.91%	9.94%
USSD Free	64.91%	7.80%	2.64%	15.41%	9.23%
USSD Lottery	79.96%	5.13%	1.28%	5.76%	7.87%
USSD non-experimental	79.21%	5.18%	1.06%	6.40%	8.15%
MXIT	57.15%	14.60%	6.20%	14.27%	7.78%
Mobi	71.26%	11.24%	3.96%	7.74%	5.80%
Twitter/Gtalk	83.00%	3.00%	2.00%	7.00%	5.00%
Other	72.56%	6.30%	1.48%	10.51%	9.15%

Cells give fraction of each channel (rows) that give each response to the engagement question (columns) from the VIP:Voice data.

Table 9. Engagement and Participation

Sample:	**All**	**All Registered**				
Answer to question: "It's election time! Do u think ur vote matters?"	Registered	Any Phase 2	Gave Demographics	Volunteered Phase 3	Any Phase 4	Answered Voting Question
	(1)	(2)	(3)	(4)	(5)	(6)
Yes, every vote matters	0.693***	0.455***	0.384***	0.0350***	0.144***	0.0629***
	(0.0016)	(0.0020)	(0.0020)	(0.0008)	(0.0014)	(0.0010)
No, but I'll vote anyway	0.609***	0.433***	0.362***	0.0283***	0.142***	0.0660***
	(0.0045)	(0.0059)	(0.0057)	(0.0020)	(0.0041)	(0.0029)
Not Voting/Not Registered	0.669***	0.460***	0.397***	0.0115***	0.0834***	0.0402***
	(0.0033)	(0.0043)	(0.0042)	(0.0009)	(0.0024)	(0.0017)
Observations	118,093	80,344	80,344	80,344	80,344	80,344
R-squared	0.6810	0.4540	0.3840	0.0330	0.1370	0.0610
F-Test: Yes=No, Vote Anyway	308.3***	13.44***	12.77***	10.01***	0.224	1
p-value	0	0.000246	0.000353	0.00156	0.636	0.317
F-test: Not Voting = No, Vote Anyway	115.98***	13.94***	24.77***	60.5***	150.1***	58.24***
p-value	0	0.000189	0.000000647	0	0	0

OLS regressions with robust Standard Errors. Regressions estimated with no intercept so coefficients give fraction of each initial engagement level (rows) that engage across phases of the project (columns). Estimated only on the sample that answered engagement question other than 'skip' or 'too young to vote'. Column (1) estimated in entire remaining sample, and columns 2-6 estimated in remaining sample that also registered for the VIP:Voice platform. *** p<0.01, ** p<0.05, * p<0.1

Table 10: Differential Impact of Subsequent Incentives on Participation

	Answers Survey Questions on Entry into System:					
	Answers **Incentivized** Questions	Answers **Unincentivized** Questions	**Differential Probability**, (Incentivized - Unincentivized)	**Volunteers to Monitor**	**Responds to 'Did you Vote?'**	**Voted, if responds to 'Did you Vote?"**
	(1)	(2)	(3)	(4)	(5)	(6)
"Free" Treatment	0.0787***	0.0187***	0.0670***	0.0104**	-0.004	0.0521*
	(0.007)	(0.004)	(0.007)	(0.005)	(0.009)	(0.030)
"Lottery" Treatment	0.0819***	-0.003	0.0839***	0.001	-0.0136*	0.0770***
	(0.006)	(0.003)	(0.005)	(0.004)	(0.007)	(0.027)
Incentivized to Monitor				0.0245***		
				(0.006)		
Monitor Incent * "Free"				-0.011		
				(0.008)		
Monitor Incent * "Lottery"				(0.002)		
				(0.007)		
"Voice" GOTV Treatment					-0.011	0.0826***
					(0.009)	(0.030)
"Visibility" GOTV Treatment					-0.007	0.049
					(0.010)	(0.033)
"Voice" * "Free"					-0.007	-0.110***
					(0.012)	(0.041)
"Visibility" * "Free"					0.004	-0.032
					(0.012)	(0.041)
"Voice" * "Lottery"					0.015	-0.105***
					(0.010)	(0.033)
"Visibility" * "Lottery"					0.010	-0.0662*
					(0.011)	(0.036)
Constant (Control mean)	0.219***	0.0588***	0.186***	0.0376***	0.0988***	0.864***
	(0.005)	(0.003)	(0.005)	(0.004)	(0.007)	(0.025)
Number of observations	40,335	40,335	40,335	34,717	37,653	3,329
R-squared	0.005	0.001	0.005	0.002	0.000	0.005
F-test: Free = Lottery	0.311	43.340	9.158	5.028	2.298	1.576
Prob > F	0.577	0.000	0.002	0.025	0.130	0.209

note: *** p<0.01, ** p<0.05, * p<0.1

OLS regressions with robust SEs. All regressions use only the sample experimentally recruited in to USSD by PCM.

FIGURES

Figure 1: Waterfall of Recruitment and Experimentation.

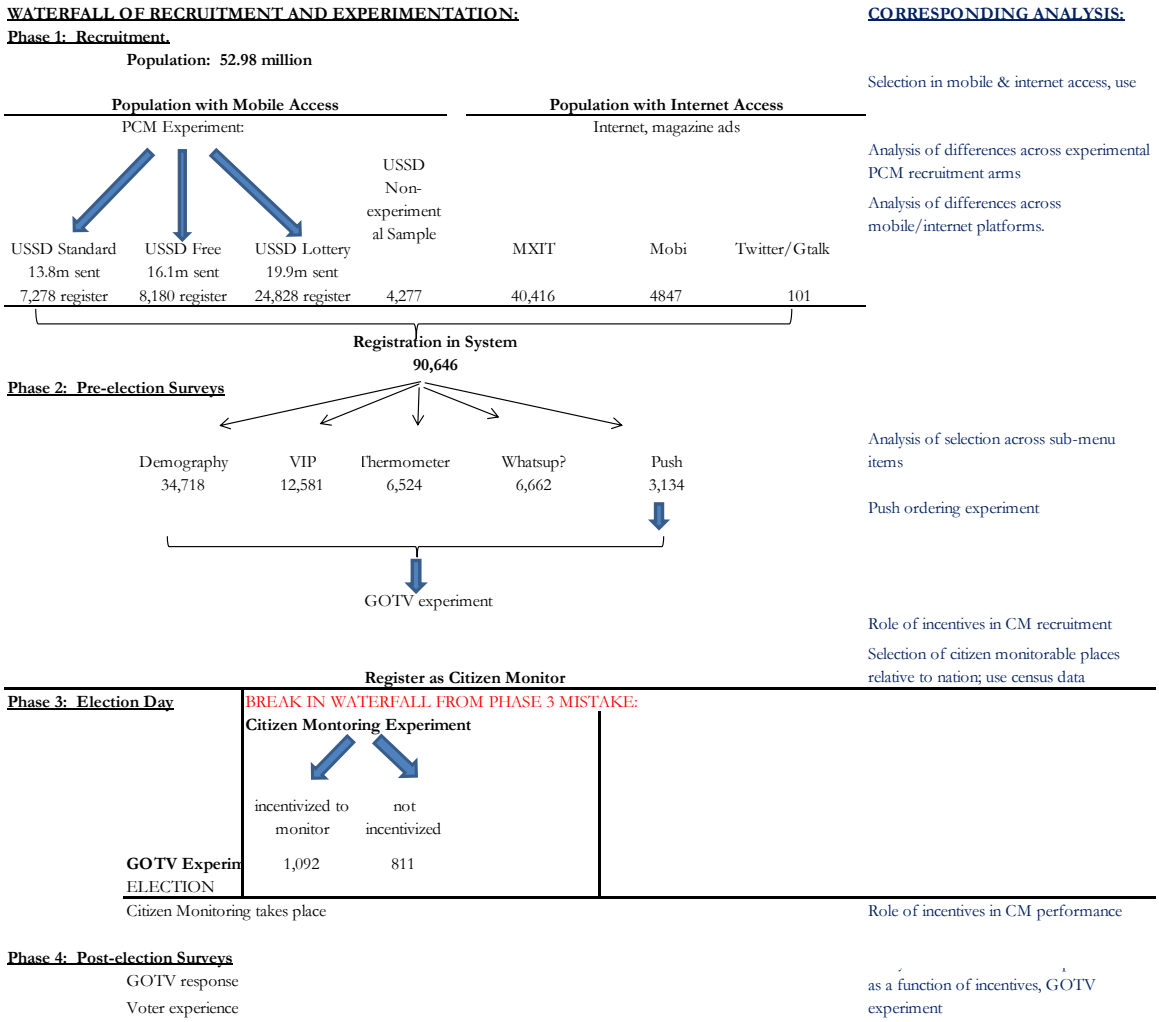


Figure 2: Pre Election Opinion Polling

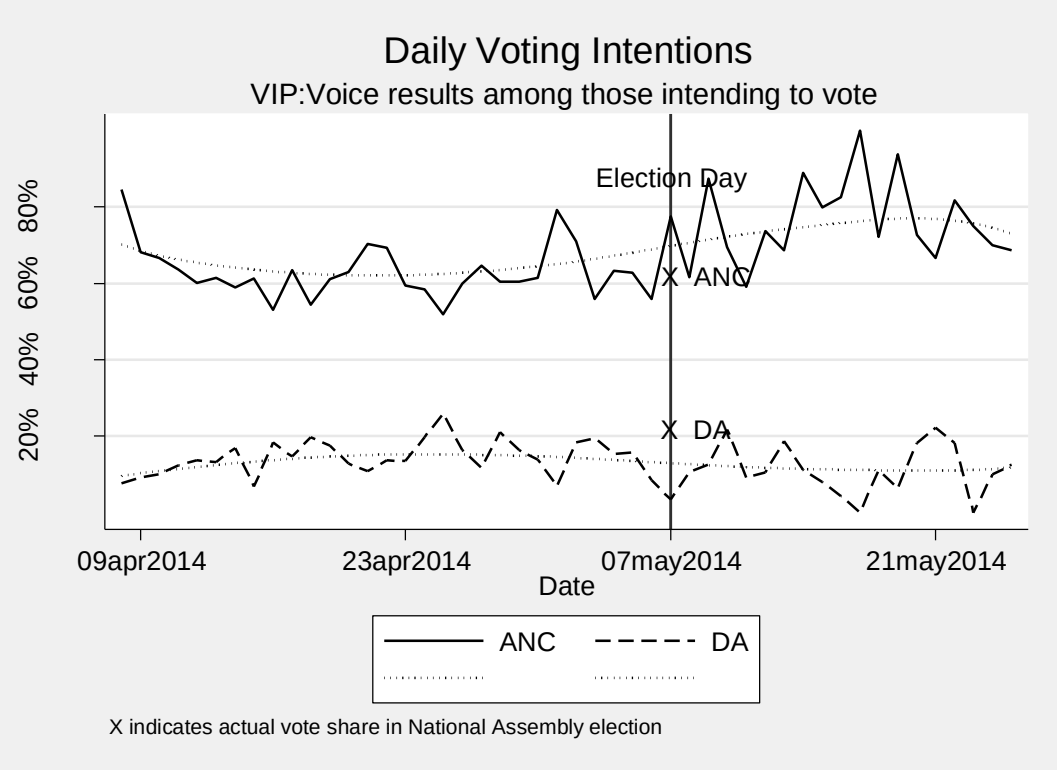
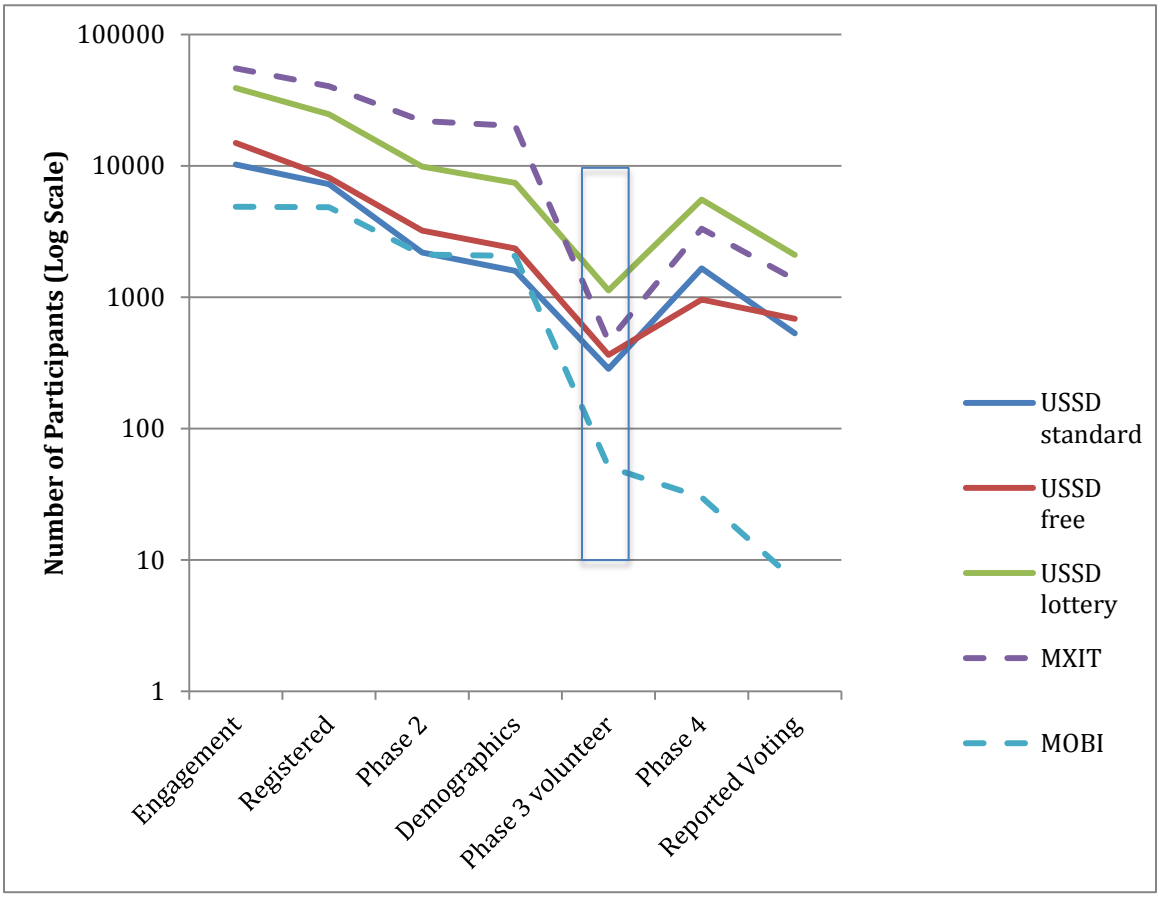


Figure 3: Number of Participants by Channel



APPENDIX

Table A1: Expected Recruitment by Channel

Advertising Channel	Interaction Channel	Expected Impressions	Expected Recruitment
Mxit broadcast messages and splash page ads	Mxit	3,900,000	78,000
Mobi banner ads	Mobi	26,000,000	7,200
Google adwords	Mobi	550,000	15,000
Promoted tweets and accounts	Twitter	1,980,000	15,000
Facebook page posts	Facebook	5,000,000	45,000
Please Call Me (PCM) messages	USSD	20,000,000	200,000
Live Magazine SA Google+ posts	Google+	67,000	1,500
Live Magazine print ads	All channels	60,000	1,000
Total		**57,557,000**	**362,700**

Table A2: Balance of the Phase 3 incentives experiment as actually performed:

VARIABLES	phase3_volunteer_SAMPLE	entry_ussd	phase_2_ever	whatsup_ever	vip_ever	age_num	male	black	election2009_yes
Incentivized to Monitor	-0.000125	-0.00787	0.0156	0.00271	0.00113	0.684	0.0152	0.00956	-0.0432
	(0.006)	(0.010)	(0.014)	(0.003)	(0.005)	(1.376)	(0.077)	(0.024)	(0.087)
Constant	0.0147***	0.960***	0.0994***	0.00368	0.00982***	26.35***	0.300***	0.978***	0.611***
	(0.004)	(0.007)	(0.011)	(0.003)	(0.004)	(1.064)	(0.060)	(0.019)	(0.068)
Observations	1911	1,911	1,911	1,911	1,911	142	152	124	135
R-squared	0	0	0.001	0	0	0.002	0	0.001	0.002