Journal of Universal Computer Science, vol. 17, no. 3 (2011), 498-512
submitted: 30/10/10, accepted: 28/1/11, appeared: 1/2/11 © *J.UCS*

Rule of Law on the Go: New Developments of Mobile Governance

Marta Poblet
(ICREA, UAB Institute of Law and Technology, Barcelona, Spain
Marta.poblet@uab.cat)

Abstract: This paper offers an overview of the emerging domain of mobile governance as an offspring of the broader landscape of e-governance. Mobile governance initiatives have been deployed everywhere in parallel to the development of crowdsourced, open source software applications that facilitate the collection, aggregation, and dissemination of both information and data coming from different sources: citizens, organizations, public bodies, etc. Ultimately, mobile governance can be seen as a tool to promote the rule of law from a decentralized, distributed, and bottom-up perspective.

Keywords: governance, mobile technologies, mobile governance, rule of law, crowdsourcing
Categories: H.2, H.4

1 Introduction

Mobile governance is an umbrella term that covers a number of initiatives involving the use of mobile technologies (i.e. SMS, USSD, geolocation, etc.) in the domains of citizens' participation, public awareness, management of emergencies and crisis, provision of public services, information, etc. to reach wider population segments (as compared to those currently accessing the Internet). It is well known that mobile phones have become in recent years the most ubiquitous communication device world wide, with higher penetration rates than the Internet. In 2010, the number of mobile cellular subscriptions globally is expected to reach five billion [ITU, 10]. Mobile technologies provide therefore greater opportunities for social impact than any other ICT, while being more affordable and, also, less demanding in the skills and training required [Kinkade *et al.*, 08].

While deeply intertwined to e-governance, mobile governance (or m-governance *tout court*) emerges as a new domain with two-fold objectives: on the one hand, it aims at improving the provision of basic public services, specially to the less favoured populations; on the other, it bolsters the participation of citizens, grass-root organizations, NGOs, etc. in awareness campaigns, electoral processes, oversight of governments and public policy making [Hellstrom, 08]. In Hellstrom words, "mobile phones make it possible to create a bottom up participation and ultimately–what m-governance is all about–empowerment [Hellstrom, 08]. This paper presents a brief overview of this nascent domain and makes a case for considering m-governance as a crucial development of the broader domain of e-governance.

2 Governance, e-Governance, and m-Governance

For some years now, the concept of governance has been defined and measured in multiple ways by scholars, international organizations, think thanks, practitioners, etc. While some definitions emphasize the relationship between governments and citizens or markets, others highlight how institutional structures, procedures, and processes need to be implemented to deliver public services under the rule of law. Despite the variety of approaches, the notion of good governance is generally related to the principles of rule of law [Kaufmann, 08], transparency, accountability, and public participation [Sasaki, 10].

The use of the Internet and other information technologies (IT) to support governance mechanisms has lead to the new paradigm of e-governance. This paradigm is broad enough to include (i) *IT supported* governance—where IT support the provision of conventional, offline public services, (ii) *IT enhanced* governance—where IT provide a complementary online channel to facilitate the relationship between government agencies and citizens, companies, organizations, etc., and (iii) *IT enabled* governance—where IT open unprecedented venues to empower citizens with improved access to government information and data (i.e. the movement of Open Data in different countries).[1] While these different uses of IT for governance usually coexist in many countries, their effective impact on making governments more transparent and accountable, or making citizens more participant should be analyzed separately. Recent case studies show that while more and more government agents publish information on their activities and budgets, they may do so "in ways that are not easily accessible or comprehensible" [Sasaki, 10]. Similarly, recent empirical research provides contradictory results on the impact of the Internet on public participation and on the forms it adopts. Main debates focus on whether the Internet and other information technologies are valid sources of the skills, resources, and mobilization needed for participation—according to the "civic voluntarism" model [Verba, 95]—, and even on different conceptualizations "of the meaning and empirical referent of political participation" [Anduiza, 09]. As regards the forms of political participation, Sifry acknowledges that Internet-powered politics facilitates "a more open, participatory and accountable political process", warning at the same time that:

The rapid rise of social media has generated more talking than listening, more pushing than parsing, and more fragmentation of attention than concentration. The resulting sense of information overload may cause more people to retreat from the public arena, simply because it feels too crowded and noisy. [Sifry, 10]

The experiences with e-governance may also return paradoxical results as regards citizens' participation and trust in electronic institutions and procedures. As Hattotuwa grimly puts from his Sri Lankan experience [Hattotuwa, 08]:

Good governance in 2008 is no better and arguably in a condition far worse after the introduction of e-Governance than before it. This is not to say that e-Governance initiatives per se have contributed to the deterioration of democracy, but suggest

[1] http://www.data.gov in the US, http://data.gov.uk in UK, or http://www.opengov.se/data

instead to the heady telecentre idealists who reside in the stratosphere that on the ground, few citizens access telecentres to strengthen and interact with mechanisms and institutions of (local and national level) governance that are failing them daily. Some Government forms are readable and downloadable on PCs (and that too not always in Tamil), and one can see how the local government representative looks like on a webpage (for one never see him in real life) and get the numbers of telephones and faxes that are many-a-times outdated and dysfunctional.

The Sri Lanka example applies to many other countries. On the one hand, Internet penetration rates are low or very low in developing countries—18 users per 100 inhabitants—and remain modest in global terms: roughly one quarter of the world population (26.8) has access to the Internet [ITU, 10]. On the other, adding IT to governance mechanisms requires physical infrastructures and operational designs that are lacking at different levels. And even if governments are willing to provide services or public information on their activities, they may fail the attempt: transforming information reports or budgets—usually both lengthy and/or highly technical—into meaningful data that people can visualize, compare, contrast, comment, etc. is not a straightforward road to travel through.

Mobile governance, or the use of mobile technologies to enhance the provision of online services and enable new communication channels may certainly contribute to remove some barriers to the delivery of electronic services and the participation of citizens and groups in public affairs. In this regard, Kaisalam includes within the domain of mobile governance both G2C and C2G interactions (i.e. providing relevant information to citizens and complaining about services, respectively), mobile services (i.e. transactions and payments), mobile democracy (i.e. use of SMS for citizen input to political decision-making), mobile administration (i.e. a seamless environment for governmental agencies) and government management of emergency situations (i.e. in the aftermath of natural disasters) [Kailasam, 10]. In a different perspective, the Juniper Research White Paper on mobile governance [Houston, 06] further distinguishes in G2C between "citizen-facing mGovernment", which requires "user-friendly approaches to accessing the enormous amounts of content now available", and "operational work" that "imposes separate requirements in fields that include repair and maintenance work, communications with elected representatives, health care, community resources, and social services provision." [Houston, 06].

While it "also rel[ies] on good back office ICT infrastructure and work processes: governance networks and databases, data quality procedures, transaction recording processes, etc." [Kailasam, 10], mobile governance is generally considered to offer better perspectives than PC-based e-governance models. A frequently repeated argument for the extension of mobile governance relies on statistics unanimously showing how the numbers of mobile phone owners outnumber by far those of wired lines and Internet users. Potentially, then, broader population segments can be reached. A number of recent studies have indeed proved how mobile governance initiatives are currently been developed in rural areas with poor or none Internet access [Kinkade and Verclas, 08; Kaisalam, 10]. From the citizens' perspective, mobile governance holds the promise of shaping conversations and information services to make them more "decentralized, two-way, adaptive, resilient, and pervasive" [Hattotuwa, 08]. But will the mere possession of relatively inexpensive hand-held devices make citizens more aware and vigilant towards state institutions?

Will make them more prone to public participation, in whatever form this may take? As Vincent and Harris point out, "just because modern communications technology is now widely available, it does not necessarily follow that people will be prepared to change their established practices and use their mobile phones to interact with government." [Vincent, 08]

These are for sure updated research questions relevant to the well established domains of governance and political participation. To address these questions in full is out of the scope of this paper, but we will approach them by reviewing some experiences in developing countries and some bottom-up initiatives that have flourished from the collaboration between groups of technologists and activists, civil society organizations, and NGOs. Often referred to as "mobile activism", these initiatives are coincident in the use of disruptive, low-cost, little- learning-curve technologies such as SMS and may provide transparent testbeds for large mobile governance programs.

3 Mobile Governance in Developing Countries

While mobile governance initiatives can be found in a ever growing number of countries [i.e. Vincent, 09], developing countries, specially those where a high mobile density contrasts with low rates of Internet users and PC penetration, are taking the lead in what we could refer to as SMS-based governance. This is notably the case of India. The India Development Gateway[2] reports at the end of 2009 more than thirty mobile based public services operating in a country which ended that year with more than 500 million subscribers [ITU, 10b].

The Philippines is another case in point [Paule, 04; Lallana, 06]. As both researchers highlight, "Filipinos claim with pride that the Philippines is the 'texting capital of the world.'" [Lallana, 06]. Truly enough, ITU data on SMS traffic find that the Philippines and the United States combined accounted for 35% of all SMS sent in 2009 [ITU 10c]. Accordingly:

About half of Philippine government agencies offering e-services have incorporated SMS as a service delivery mechanism and in enhancing political participation. Another study, conducted by the (Philippines') National Computer Center in June 2005, revealed that fifty (50) government agencies have their own SMS-based services. Of these fifty agencies, sixteen (16) are Departments (or Ministries), three (3) are bodies mandated by the constitution (commissions), twelve (12) are government-owned or controlled corporations, and four (4) are agencies under the Office of the President. The three main purposes of these fifty (50) SMS-based services are to provide information, to set-up feedback mechanisms for stakeholders either in form of complaints or suggestions, and to make service delivery faster and more convenient [Lallana, 06].

In Kenya, Mwololo and Muthawa analyzed the results of a 2008 survey to citizens on e-governance and reported that "about half of the sampled Kenyans (49.2%) have used their mobile phones to access government websites. This is in spite

[2] http://www.indg.in/e-governance/mobilegovernance/mobile-based-services

of factors such as poor feedback from government and outdated information." [Mwololo, 08]. The results allow the authors to conclude that "the potential for better and extensive interaction between government and citizens lie on mobile phones, hence the need for the government to re-consider its e-governance strategy to mainstream mobile phones." [Mwololo, 08].

Finally, Bangladesh is also on the way towards adopting the mobile paradigm at the forefront of its digital agenda. As Saleh has put it: "in a resource starved country like Bangladesh where almost forty percent of the population earns less than a dollar a day, providing this access via desktop solutions is untenable" [Saleh, 10]. Consequently, mobile based services are already being utilized by several agencies of the government.

It is in those countries where there are little e-governance architectures to build upon that "the deployment of indigenously developed, web-enabled, mobile devices (…) make it possible to offer cost effectively, services at the doorstep of the common citizen." [Sundar, 10], lowering the barriers to acceptance of these devices.

4 Mobile Technology for Citizens Engagement

On March 13, 2004, forty-eight hours after the terrorist attacks of March 11 in Madrid, thousands of people concentrated before the headquarters of the Popular Party, then in office. The demonstrators wanted to know the truth on the responsibility for the attacks, the government having put the blame on the Basque terrorist organization ETA from the immediate outset. The concentration was organized in a decentralized way by means of SMS. The use of mobiles to bolster political mobilization was replicated, among other places, in the Philippines to protest against a reform on taxes (2004), in the independence referendum in Montenegro (2006), in Burma during the Saffron Revolt (2007), in Kenya, India, or Iran after the respective electoral processes and in several countries in Africa [Ekine, 10]. Specifically, mobile activism has also a significant impact on the monitoring of the electoral processes, where it can influence the way in which the elections are organized [Schuler, 08]. According to Miard, mobile phones shape this particular form of activism by bringing into the front three important factors: mobility, personalization and multimodality [Miard, 09]:

Mobility adds a spontaneity factor to potential mobilization, because users can react instantly and emotionally to events. Personalization is given through the typically person-to-person and social type of contact. Finally, the mobile phone is multimodal because it can transmit voice, images, and sounds, making it a tool for live transmission of events to be shared on the network.

Over the last few years, new horizons and opportunities for the development of mobile governance initiatives have incredibly expanded all over the world. While the core domains of application in the area of governance are citizens' activism and public participation, monitoring of election processes, advocacy, reporting of crimes and human rights violations, new creative uses are constantly emerging out of the practical needs of citizens, organizations, and public institutions. Innovation does not lie in the design of high-tech or sophisticated technology, but in the use of an

appropriate and disruptive technology such as an SMS service: appropriate in the sense that it is suited to the environment in which it is used [Schumacher, 73], which is this case is composed of citizens owning and interacting with a mobile phone, and disruptive in Christensen's sense [Christensen, 97] insofar it exploits the most basic capacities of already existing technologies to reach broader population segments which otherwise would not have had access to more costly and sophisticated mobile technologies (i.e. the mobile Internet).

In this line, a number of new platforms, applications and tools have simultaneously emerged and there are teams of developers around the globe cooperating in a decentralized way to improve alpha and beta versions of the software. These applications have all been developed during the second half of the decade as open source mobile solutions for emergencies, crisis management, and social development in a number of areas.

There are two distinctive features applying to the vast majority of these solutions. First, they are SMS-based and, therefore, do not necessarily need to be connected to the Internet to operate, which is a critical asset when, as is frequently the case, networks are down or shut off for either natural or political reasons (it may obviously happen with mobile networks as well, but in this case is easier to re-establish the services or search for technical alternatives). Secondly, the applications considered so far focus primarily on information gathering and sharing and on coordinating direct political actions, but less on decision making for public policies and other political deliberations [Hellstrom, 08]. In addition, the applications share some defining characteristics of crowdsourced systems—how they are and sustained—as defined by Kazman and Chen in their "metropolis model" [Kazman and Chen, 09]. Among those characteristics are:

- Open, community-driven, and decentralized teams of developers (vs. closed and hierarchical teams)
- Mashability, or creation by composition (as the software componens are non rivals)
- Unknowable, overlapping or conflictive requirements, since participants operate independently and their requirements can never be globally knowable
- Continuous evolution, since a crowdsourced system is never "done" and hence never stable (that is, in a state of "perpetual beta").
- Focus on operations, rather than on development or maintenance (services must be reliable and accessible as a public utility
- Sufficient correctness, or an admission and acceptance of ongoing incompleteness
- Unstable resources, subject to the whims of the peers (although large numbers tend to ameliorate the whims of any individual or individual resource since multiple, often overlapping, solutions to a single problem may be provided, thus reducing the importance of the success of any particular solution or individual
- Emergent behaviors that are beyond the vision and intent of their creators ("once the crowds are invited in, determinism is lost").

Platform	*Ushahidi*	*Frontline SMS*	*RapidSMS*	*Swift River*	*SlingshotSMS*	*SMS Turks*	*Freedom Fone*
Developer	Ushahidi	Kiwanja	UNICEF, Dimagi, MVP	Ushahidi & Meedan	Development Seed	Ushahidi	Kubatana Trust
Release year	2008	2005	2009	2009	2009	2010	2009
Status	Version 1.0	Version 1.5.5	Alpha	Alpha 0.0	Version 2.0	Not available	Version 1.5
Main purpose	Submit crisis information through text messaging using a mobile phone, email or web form	Enable mobile users to send and receive text messages with large groups of people through mobile phones.	Support the creation of personalized interdependent platforms for diverse use-cases	Determining the veracity and and accuracy of news during a crisis	Provide a gateway to act as a bridge between mobile phones and the web.	Help volunteers manually parse information out of text messages	Create and conduct polls via SMS, collect opinions via telephone and make them available online
Functionalities	SMS, email & web-based data gathering + Geolocation + timeline	Create forms to be sent to a Java-enabled mobile phone through a text message. Data collection functionalities	Collect quantitative and qualitative data through SMS. Used in Supply Chain Management, Patient Tracking and Decision Support	Database and user interface to gather and filter streams of data through both machine based algorithms and humans to understand their veracity	A minimal SMS server which connects GSM modems to websites and applications via a HTTP interface	Allow translation, categorization and basic geocoding of all incoming messages	Voice menu, SMS polls, leave-a-message voice menu, information callbacks
Interoperability	Mapping applications (Google, Yahoo, MSN, OSM maps), FrontlineSMS, Clickatell, IntelliSMS, Twitter, StatusNet	Integration with Ushahidi	Has developed Rapid Android, Used by CommCareHQ	First used as a complement to Ushahidi. Builds on Twitter Vote Report	Uses pygsm, sponsored by UNICEF. Integration with Managing News	Integration with Ushahidi	
Use Cases	Kenya, Lebanon, Mexico, Madagascar, Afghanistan, Gaza, Philippines, India, DR Congo, South Africa, Haiti, Chile	Worldwide (used in + 40 countries)	Ethiopia, Kenya, Nigeria, Somalia, Malawi, Uganda, Rwanda, Tanzania, Senegal, United States	India		Haiti	Zimbabwe, Tanzania

Table 1: Open source software applications for m-government

Table 1 summarizes the main features and functionalities of the most relevant software applications recently developed and tested in a large number of world areas for different political and social purposes:

4.1 Ushahidi

Ushahidi—"testimony" in Swahili—is a platform that allows its users to gather distributed data via SMS, email or web and visualize it on a map or timeline.[3] Through Ushahidi people report real time information of events such as political disruption or natural disasters and the platform aggregates this incoming information for use in a crisis response. The website was created at the beginning of 2008 as a simple mashup, using user-generated reports and Google Maps to map reports of violence in Kenya after the post-election fallout, and it has been used in a number of election processes afterwards (Mexico, India, Afghanistan, Sudan, Mozambique, etc.) But Ushahidi is perhaps best known for the deployment set in January 2010, dedicated to the Haiti earthquake. Ushahidi, together with multiple organizations (FrontlineSMS:Medic,[4] CrowdFlower,[5] Samasource,[6] etc., partnered in the design of a system that allowed volunteers from anywhere in the world to come online and translate, geolocate and categorize emergency messages in real-time [Munro, 10].[7]

4.2 Frontline SMS

Frontline SMS was started in 2005 and it enables users to send and receive text messages with groups of people through mobile phones. It works with existing plans on all GSM phones, modems and networks.[8] Frontline is mostly used in areas such as human rights monitoring, disaster relief coordination, natural resource management, and lection monitoring. Recently, a number of related organizations have spin off: FrontlineSMS:Medic[9] (mobile health), FrontlineSMS:Credit[10] (mobile financial services), FrontlineSMS:Legal[11] (mobile legal and conflict resolution services), and FrontlineSMS:Learn[12] (mobile education).

4.3 RapidSMS

RapidSMS is an open source framework for developing SMS-based applications. Within this framework, RapidResponse is a customized mHealth platform developed for the Millennium Villages Project with support from the UNICEF Innovation Group.[13] It is a web-based platform for data collection, logistics coordination, and

[3] http://www.ushahidi.org
[4] http://medic.frontlinesms.com/
[5] http://crowdflower.com/
[6] http://www.samasource.org/
[7] See http://www.mission4636.org/history/ for history and collaborating institutions.
[8] http://www.frontlinesms.com
[9] Supra note 4
[10] http://credit.frontlinesms.com/
[11] http://legal.frontlinesms.com/
[12] http://learn.frontlinesms.com/
[13] http://www.unicefinnovation.org

communication developed by the Innovations and Development team of UNICEF. It uses SMS text messages to facilitate and coordinate the activities of field based health care providers, usually community health care workers. With the web interface, multiple users are able to access the system simultaneously and to view incoming data as they arrive, export new data-sets, and send text messages to users. [14]

4.4 Swift River

An Ushahidi initiative, SwiftRiver is a platform that enables the filtering and verification of real-time data from channels such as Twitter, SMS, Email and RSS feeds. Initially a toolset for crowdsourced situational awareness, SwiftRiver has also been used in election monitoring. [15] Thus, one of the first uses of Swift was as a complement to Ushahidi to monitor the Indian 2009 Elections. Swift River establishes different levels of filters based on the notion of "folsonomic triage" [Gosier, 10] and embraces Semantic Web open standards such as FOAF, iCal, Dublin Core, as well as open publishing endpoints such as Freebase to add structure to crisis data and make them shareable.

4.5 SlingshotSMS

SlingshotSMS is a lightweight SMS gateway that can run on a laptop or a USB drive.[16] SlingshotSMS sends and receives text messages on behalf of a web application. It builds on the work of pygsm, a Python library developed by UNICEF Innovation to deal with AT-compatible modems.

4.6 SMS Turks

SMS Turks is a recent application developed by members of the Ushahidi community to help volunteers working with Ushahidi to manually parse information out of text messages immediately after the Haiti earthquake. The system, to be newly rewritten, allows translation, categorization and basic geocoding of all incoming messages.[17]

4.7 Freedom Fone

Freedom Fone allows NGOs, humanitarian, and media organisations to create and conduct polls via SMS, collect opinions via telephone and make those results available online. It integrates interactive voice response (IVR), polls, and SMS in a simplified interface. The scenarios of use are epidemics and emergency relief, elections, minority languages, agricultural extension, special interest groups, community radio support, etc. Freedom Fone builds on several open source projects that include: FreeSWITCH, Spidermonkey, PHP5, Cake PHP and JQuery. In addition, Freedom Fone uses Cepstral, a text-to-speech voice engine to synthesize voice messages. [18]

---

[14] Idem
[15] http://swiftly.org/
[16] http://www.developmentseed.org
[17] http://blog.ushahidi.com/index.php/2010/02/07/sms-turks/
[18] http://freedomfone.org

5 Crowdsourcing and its Effects

One of the distinctive features of the systems being currently developed is the crowdsourcing of incoming data through SMS. The notion of "crowdsourcing" was coined by Howe to describe the outsourcing of a task to "an undefined and generally large group of people in the form of an open call" [Howe, 06].

Crowdsourcing data collection with mobile technologies enables faster feedback mechanisms for more informed decision-making in rapid response situations. However, the hopes to dramatically improve crisis and disaster management through mobile technologies and crowdsourcing crisis information are nevertheless being tempered by several objections [i.e. Currion, 10]. Among those: (i) the lack of sufficient evidence to assess whether crowdsourcing makes a difference as compared to the operational strategies already in place; (ii) the risk of information overload caused by unverified data; (iii) the reliability of these data, since they are vulnerable to potential manipulation and abuse. These are central issues in the current debate on the strengths and flaws of gathering crowdsourced data to manage crisis and disaster response.

Conversely, crowdsourcing can also be extended to the response or supply side, but then the main issues—especially in large disasters—become how to track such a distributed and decentralized response in order to effectively address the needs of the populations at risk and coordinate the relief or aid tasks [Meier, 10]. The initiatives considered in this paper apply different strategies to deal with the side-effects of crowdsourcing: creating persistent identities/anonymities, tagging of incoming data, developing algorithms that filter relevant information from the noise, etc. While this may not necessarily be an issue when crowdsourcing environmental data collection (i.e. an unknown number of volunteers regularly sending reports or samples on water quality or air pollution, and then verifying those date with further test and analysis), it may raise serious concerns when the data being crowdsourced report fraud-marred elections, criminal offences, or violations of human rights in the midst of conflict events.

Crowdsourcing data collection through mobile networks holds the promise to improve decision making in emergencies, crisis and conflict events, and also to foster public participation and citizens' awareness. But it also poses and additional challenge: the threats to citizens' privacy and security, especially when they report abuses or violations of human rights in conflictive areas or in authoritarian regimes. In Shilton's words:

At the extreme, mobile phones could become the most widespread embedded surveillance tools in history. Imagine carrying a location-aware bug, complete with a camera, accelerometer, and Bluetooth stumbling, everywhere you go. Your phone could document your comings and goings, infer your activities throughout the day, and record whom you pass on the street or who engaged you in conversation. Deployed by governments or compelled by employers, 4 billion "little brothers" could be watching you [Shilton, 09].

Recent examples of political violence in Myanmar, Iran or Sri Lanka have shown not only the growing citizens' use of social media as outlets for real time reports and data on violent incidents (i.e. the use of Twitter after the 2009 Iran election) but also the exposure to government abuses when citizens use mobile networks for the same

purposes. According to Martucci, ad hoc mobile networks, which "consist of computers, often mobile, that establish on demand network connections through their wireless interfaces, enabling instantaneous networking independently of the presence or aid of any central devices" [Martucci, 09] require the design of new privacy protocols:

Thus, most of the protocols employed in wired networks are not suitable for ad hoc networks since such protocols were designed for network environments with defined borders and highly specialized devices, such as routers, servers that provide network addresses, firewalls, and network intrusion detection systems. Moreover, such an absence of infrastructure potentially augments the risk of losing control over personal information since data is routed and forwarded through many unknown devices and users can easily be monitored. Hence, information regarding a user's communicating partners and even the contents of transmitted messages can be obtained by devices forwarding packets on the behalf of a user, if proper security measures are not implemented. Furthermore, data collection is especially not transparent in ubiquitous environments since invisible interfaces can greatly reduce the users awareness regarding when and what personal data is being collected by the ubiquitous environment [Martucci, 09].

While crowdsourcing offers a number of advantages to mobile governance initiatives and projects, their side-effects in terms of quality, accuracy, trust, and privacy also need to be addressed to avoid the consequences of technological misuse and subsequent risks for citizens.

6 Designing Mobile Governance Programs

For some years now, the specialized literature has discussed whether mobile governance program faces specific challenges as compared to e-governance ones. According to Singh, "the main challenges of m-governance are typically the same as those of e-governance, such as low levels of computerization of government operations at the back-end, lack of digitized data or content, change management, etc." [Singh, 10]. A similar approach is found in Houston, who states that:
eGovernment has done the groundwork for mGovernment in terms of the fundamental taxonomies of information, modes of effective online presentation, and content production and management. The challenges of citizen-facing mGovernment relate chiefly to the limitations of display, user input, and overall device functionality [Houston, 06].

In contrast, Vincent and Harris argue that "the social practices of a mobile phone user are not the same as for other communication technologies so this assumption may well be erroneous". [Vincent, 09]. This latter position takes into account a sociological perspective that is absent in the former. If Katz and Aakhus are right when they call attention on the *Apparatgeist* of our time [Katz, 02], in which culturally coded uses of mobile technologies coexist with global trends, then we will need to conclude that these uses do not simply mirror the social practices of the wired world. Rather, if mobile technologies are opening new brand forms of communication, the requirements of programs will need to focus on how those forms take place.

Which are therefore the distinctive requirements to ensure the adequacy of mobile governance programs? To Vijayakumar *et al*., mobile governance projects may not necessarily "pose huge technology challenges" [Vijayakumar *et al*]. The Kerala M-Governance Project in India, thus, has set "SMS, Voice and Data servers that are being used for M-Governance [that] are based on Open Source technology and run on Linux" [Vijayakumar *et al*]. In contrast, as they go on, the requirements may be unique, since the solutions proposed need to be: (i) accessible to the masses, irrespective of their socio-cultural and educational background; (ii) scalable to such an extend that the entire population benefits from them; (iii) acceptable by and deployable across all the operators, (iv) replicable and deployable with minimal changes, for similar requirements [Vijayakumar *et al*].

In their review of case studies reporting innovative experiences on mobile governance projects, Kinkade and Verclas have also identified some key strategies that seem to be present [Kinkade, 08]:

- Evolutionary (vs. revolutionary)
- Embedding the mobile component into an already ongoing initiate (vs. casting the mobile service as itself the development effort or otherwise asking the technology to lead the effort)
- Using the mobile technology to reduce transaction costs or increase productivity of existing practices, versus introducing entirely new behaviours via the mobile
- Requiring only basic literacy or skills from users, versus requiring additional technical knowledge or support

More specifically, a number of choices have been identified relating to: intended users (general public, population niches, professional groups, etc.), technical accessibility of the solution offered (i.e. low feature handsets vs. smart phones), self-contained solutions vs. links to other external platforms and services, and requirements from manufacturers or operators (i.e. cooperation with network operators on SIM cards or USSD channels, or with handset manufacturers). As Hellstrom reminds, most projects have a strong local technological partner making it easier to manage, integrate and sustain the applications, so that the responsible body running the service hardly needs to know more than the end-user [Hellstrom, 08, 10]. Successful m-governance applications, in sum, rely on a functioning, effective backend for content and support from a local technological partner facilitates the adoption of technologies [Hellstrom, 08].

Additional challenges include cost, revenue sharing, content updates, interoperability, and usability [Helström, 10]. Singh also mentions simplicity of text messages, affordability of mobile devices and the need of applications than can be offered in local languages [Singh, 10].

7 Conclusions

The debate on whether mobile governance is the next step—a substitute—for e-governance or, rather, it is a complementary domain remains open. For some experts, mobile governance is complementary to present e-government services insofar it facilitates the extension of their reach [Kaisalam, 10]. For some others, i.e. Sundar and Garg "the paradigm shift from e-governance to m-governance (…) results in radical differences in the key processes of creating, maintenance and usage of knowledge, creation of secure mobile transaction & delivery system, establishment of the appropriate infrastructural support for multi-mode direct citizen interface and delivery mechanisms [Sundar, 05]. According to Mwololo and Muthama, there is no conclusive answer, since "this will probably depend on the context under which these concepts are being investigated" [Mwololo, 2009].

Both e-governance and mobile governance certainly share the goal of providing better public services to citizens by improving access to information and data and, conversely, by opening new avenues for public participation in policy making and political debate. Despite this obvious convergence, e-governance and m-governance seem to look with their own glasses challenges regarding technological choices, target populations, usability, scalability of projects, costs, privacy issues, etc. Addressing these issues and harnessing the full potential of the existing technologies available in both areas will certainly contribute to an evolutionary but sound transform of how public institutions, organizations, and citizens alike promote the rule of law on daily bases.

Acknowledgements

The research presented in this paper has been developed within the framework of two different projects: (i) ONTOMEDIA: Platform of Web Services for Online Mediation, Spanish Ministry of Industry, Tourism and Commerce (Plan AVANZA I+D, TSI-020501-2008, 2008-2010); (ii) ONTOMEDIA: Semantic Web, Ontologies and ODR: Platform of Web Services for Online Mediation (2009-2011), Spanish Ministry of Science and Innovation (CSO-2008-05536-SOCI).

References

[Anduiza, 09] Anduiza, E., Cantijoch, M., Gallego, A. 2009. Political Participation and the Internet: A Field Essay. *Information, Communication and Society*, Vol. 12: 860-878.

[Christensen, 97] Christensen, C. 1997. The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail. Boston: Harvard Business School Press.

[Currion, 10] Currion, P. 2010. If all You Have is a Hammer - How Useful is Humanitarian Crowdsourcing?, http://mobileactive.org/how-useful-humanitarian-crowdsourcing

[Ekine, 10] Ekine, S. (ed.). *SMS Uprising: Mobile Activism in Africa*. Oxford: Fahamu Books, 2010.

[Gosier, 10] Gosier, J. Crowdsourcing and Chaos Theory, http://blog.ushahidi.com/index.php/2010/10/07/crowdsourcing-and-chaos-theory/

[Hattotuwa, 08] Hattotuwa, S. 2008. Mobiles for Better Governance?, http://ict4peace.files.wordpress.com/2008/06/mobiles-for-gov

[Hellstrom, 08] Hellstrom, J. 2008. Mobile Phones for Good Governance: Challenges and Way Forward, http://www.w3.org/2008/10/MW4D_WS/papers/hellstrom_gov.pdf

[Hellstrom, forthcoming] . Mobile Governance: Applications, Challenges and Scaling-up. In M. Poblet (Ed.). Mobile Technologies for Conflict Management: New Avenues for Online Dispute Resolution. Berlin: Springer.

[Howe, 06] Howe, J. The rise of crowdsourcing. Wired 14, 6 (June 2006); http://www.wired.com/wired/archive/14.06/crowds.html

[Houston, 06]. Houston, D. 2006. Mobile Governance. Juniper Research White Paper, http://juniperresearch.com/shop/products/whitepaper/pdf/White%20Paper%20-%20Mobile%20Governance.pdf

[ITU, 10a] ITU. 2010. ITU sees 5 billion mobile subscriptions globally in 2010, http://www.itu.int/newsroom/press_releases/2010/06.html

[ITU, 10b] ITU. 2010. India passes 500 mln mobile users in November, http://www.itu.int/ITU-D/ict/newslog/India+Passes+500+Mln+Mobile+Users+In+November.aspx

[Kailasam, 10] Kailasam, R. 2010. Leveraging Mobile Technology to Extend the Reach of e-Governance, http://www.mgovworld.org/.../m-governance-leveraging-mobile-technology-to-extend-the-reach-of-e-governance.pdf

[Kaufmann, 08] Kaufmann, D., Kraay, A. 2008. Governance Indicators: Where Are We, Where Should We Be Going?. *The World Bank Research Observer*: 1-30.

[Katz, 02]. Katz, J, Aakhus, M. (Eds.) (2002) *Perpetual Contact: Mobile Communication, Private Talk, Public Performance*. Cambridge, Cambridge University Press

[Kazman and Chen, 09] Kazman, R.; Chen, H. M. 2009. The Metropolis Model: A New Logic for Development of Crowdsourced Systems. *Communications of the ACM*, Vol. 52(7): 76-84.

[Kinkade and Verclas, 08] Kinkade, S., Verclas, K. 2008. Wireless Technology for Social Change: Trends in Mobile Use by NGOs, http://mobileactive.org/files/MobilizingSocialChange_full.pdf

[Kinkade *et al.*, 08] Kinkade, S., Verclas, K., Toyama, K. 2008. Reflections on MobileActive 2008 and the M4D Landscape Wireless technology for social change, http://mobileactive.org/files/DVT_M4D_choices_final.pdf

[Martucci, 09] Martucci, L. 2009. Identity and Anonymity in Ad Hoc Networks. Ph.D. diss., Karlstad University Studies 2009 (25).

[Lallana 06] Lallana, E. 2006. SMS and Democratic Governance in the Philippines, http://www.apdip.net/projects/e-government/capblg/casestudies/Philippines-Lallana.pdf

[Meier 10] Meier, P. 2010. Using Mechanical Turk to Crowdsource Humanitarian Response. iRevolution, 5 February 2010, http://irevolution.wordpress.com/2010/02/05/mechanical-turk/

[Miard, 09] Miard, F. 2009. Call for Power? Mobile Phones as Facilitators of Political Activism, ISA 50th Annual Convention New York, Feb. 15–18, 2009, http://www.miard.ch/papers/phonesandpowerII.pdf

[Munro, 10] Munro, R. 2010. Crowdsourced Translation for Emergency Response in Haiti: the Global Collaboration of Local Knowledge,

http://www.robertmunro.com/research/Munro_AMTA.pdf

[Mwololo, 09] Mwololo, T.; Muthama, J. 2009. Shifting Shores: Investigating how the Shift from Electronic to Mobile Government Interacts with the Development Practice in Kenya, ACM International Conference Proceeding Series, Vol. 322 (Proceedings of the 3rd International Conference on Theory and Practice of Electronic Governance): 191-197.

[Paule, 04]. Paule, M.C. 2004. SMS's Capital of the World: A Political Economy of a Wireless Revolution in The Philippines. Masther Thesis, Simon Fraser University, http://lib-ir.lib.sfu.ca/bitstream/1892/9939/1/b37359848.pdf

[Sasaki, 10] Sasaki, D. (ed.). 2010. Technology for Transparency: The Role of Technology and Citizen Media in Promoting Transparency, Accountability, and Civic Participation, http://globalvoicesonline.org/wp-content/uploads/2010/05/Technology-For-Transparency.pdf

[Saleh, 10] Saleh, A. M-Governance: Embracing the new Mobile Paradigm for Service Delivery, www.digitalinnovationfair.info/index.php?option=com...view...

[Schuler, 08] Schuler, I. 2008. National Democratic Institute: SMS as a Tool in Election Observation. *Innovations*, Vol. 3 (2): 143-158.

[Schumacher, 73] Schumacher, E.F. 1973. *Small is Beautiful: The Study of Economics as if People Mattered*. New York, NY: Harper & Row Publishers.

[Shilton, 09] Shilton, K. 2009. Four Billion Little Brothers? Privacy, Mobile Phones, and Ubiquitous Data Collection, ACM Queue, vol. 7(7), http://queue.acm.org/detail.cfm?id=1597790

[Singh, 10] Singh, A. 2010. M-Governance: Service On-the-go, http://voicendata.ciol.com/content/NetworkingPlus/110010501.asp

[Sifry, 10] Sifry, M.L. 2010. Point-and-Click Politics. The Wall Street Journal, October 30, 2010, http://online.wsj.com/article/SB10001424052702304023804575566603208716666.html?KEYWORDS=micah+sifry

[Sundar, 05] Sundar, D.K.; Garg, S. 2005. M-Governance: A Framework for Indian Urban Local Bodies, http://www.mgovernment.org/resurces/euromgov2005/PDF/41_R359SK.pdf

[Verba, 95] Verba, S.; Schlozman, K.L.; Brady, H. E. 1995. *Voice and Equality: Civic Voluntarism in American Politics*. Cambridge (MA): Harvard University Press.

[Vijayakumar *et al.*, 10] Vijayakumar, S.; Sabarish, K.; Gokul, K. 2010. Innovation and M-Governance : The Kerala Mobile Governance Experience and Road-Map for a Comprehensive M-Governance Strategy, http://www.w3cindia.in/conf-site/Sanjay%20Vijaykumar%20mobme%20--Innovation%20and%20M-Governance%20-%20The%20Kerala%20Mobile%20Governance%20Experience%20and%20Road-Map%20for%20a%20Comprehensive%20M-Governance%20Strategy.pdf

[Vincent, 08] Vincent, J.; Harris, L. 2008. Effective Use Of Mobile Communications In E-Government: How do we reach the tipping point? *Information, Communication & Society* Vol. 11(3): 395–413.

[Vincent, 09] Vincent, J.; Harris, L. 2009. Early Adopter Case Studies of Effective Mobile Communications between Citizens and Government. In L. Budd and L. Harris (eds.), *e-Governance: Managing or Governing*. Rotledge: New York: 99-122.