

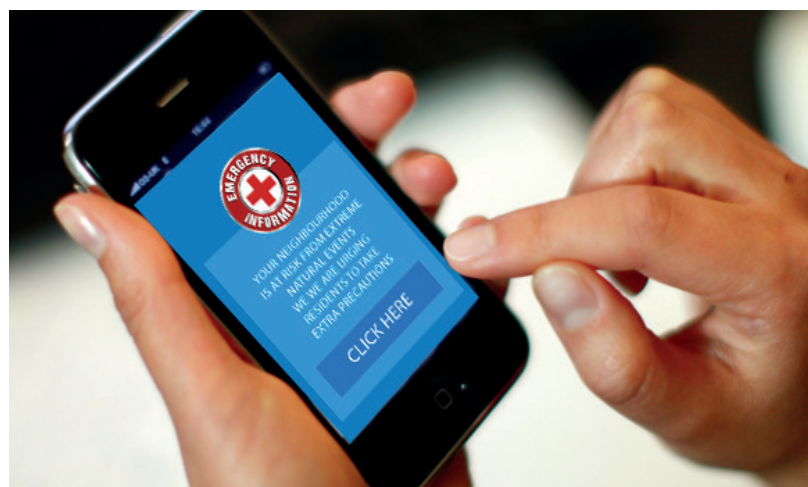
# Governing through the phone: How policy-makers can leverage ICT to improve governance outcomes

**Ali Hasanain**

*Information and Communications Technology (ICT) has developed rapidly in the last decade. The expansion of cellular networks and the falling costs of smartphones and feature phones have enabled us to communicate more rapidly, more reliably, and in more complex ways than ever before. This revolution in communication creates opportunities for policy makers to create novel and powerful governance reforms that were simply impossible in the past.*

## ABOUT THE AUTHOR

Ali Hasanain is a 2014–2016 Oxford–Princeton Global Leaders Fellow, and an Assistant Professor of Economics (on leave) at the Lahore University of Management Sciences (LUMS) in Pakistan. His research studies how Information and Communications Technology (ICT) can be applied in under-developed countries to improve governance and market outcomes. He also studies how individuals' personal characteristics mediate the success of this process. In addition, Ali has advised the Government of Punjab, the World Bank, and the Global Development Network on various public policy issues. Ali received his PhD in Economics from George Mason University in 2010.



Drawing on examples from countries around the world, this policy brief provides illustrations of the ways that ICT interventions can improve governance such as:

1. Improving monitoring of staff performance and auditing of service delivery by governments departments, and in election monitoring for institution-building;
2. Disseminating information to citizens, for example about emergency services during disaster-relief work and on agricultural extension services to farmers, and disseminating technical knowledge and training to government officials through online courses.

The brief also identifies common problems that policy-makers need to consider and address when designing an intervention. These include:

1. A tendency to be over-reliant on quantitative data received through ICT systems to the detriment of important outcomes that cannot be distilled into a number;
2. The danger that officials tasked with data collection through these ICT systems may have the incentive to subvert or tamper it, to inflate performance measures;
3. The under-utilization of data, either due to a failure to integrate it into regular official proceedings, or because it is presented in overly complex ways without processing.

Information and Communications Technology (ICT) has developed rapidly in the last decade. The expansion of cellular networks, and the falling costs of smartphones and feature phones alike, has enabled us to communicate more rapidly, more reliably, and in more complex ways. A low-end smartphone costing as little as \$50 typically has greater computing and imaging power than a dedicated laptop and digital camera from just a decade ago.

This revolution in communication creates opportunities for policy makers to create novel and powerful governance reforms that were simply impossible until recently. How can policy makers identify ways to use ICT to promote governance reforms? Here, we provide various examples of ICT reforms that each highlight different capabilities policymakers now have at their disposal.

### AGGREGATING INFORMATION FOR EFFECTIVE SERVICE DELIVERY

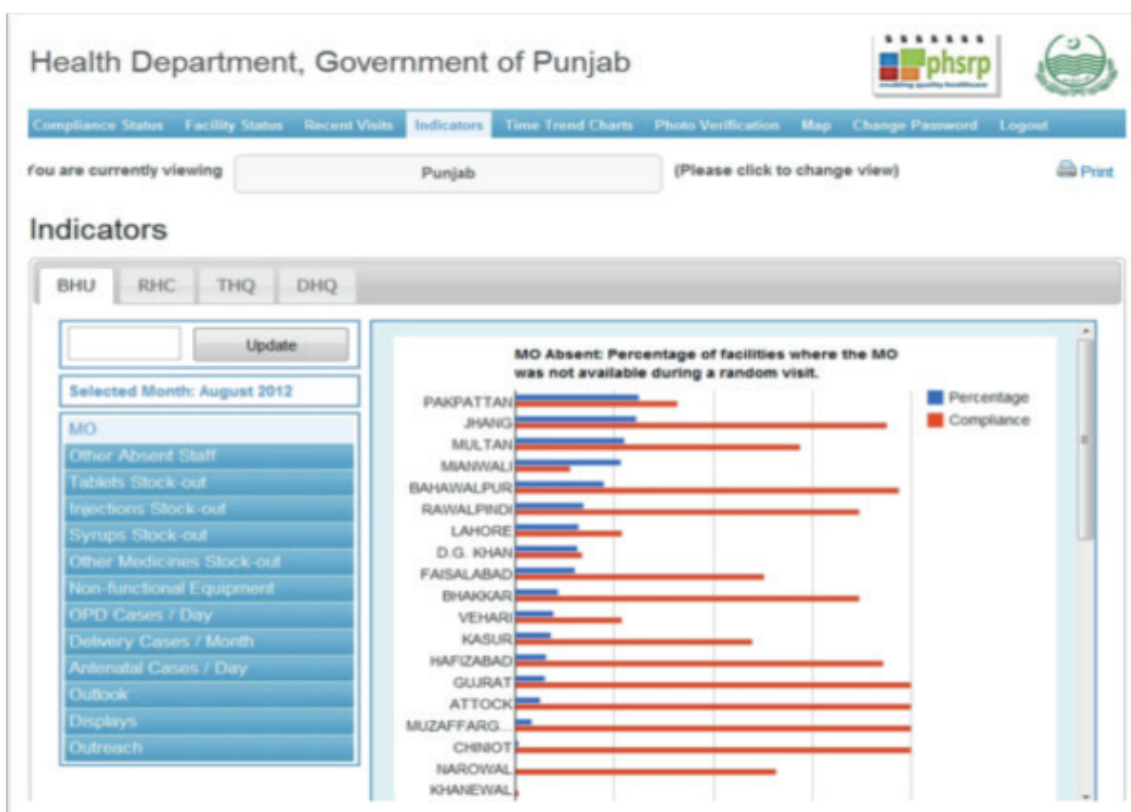
ICT allows data to flow faster, more reliably, and using fewer resources than traditional methods of communication. Governments can use this to improve information flow between different tiers of government, between the government and private citizens, and to support critical institution building.

The public sector is large and complex. It can be hard for governments to monitor the performance of their staff and ensure the delivery of high-quality services, particularly in developing countries. ICT can improve the flow of information across individuals at different levels of the government hierarchy to make data transmission more timely, remove sources of transmission error, and eliminate the duplication of effort in aggregating and processing information. This can help junior staff gain the attention of senior staff when it is needed, and allow senior officials to monitor their teams' performance.

The Punjab province of Pakistan is home to more than 100 million people, spread over an area approximately equal to England and Ireland combined. Staff for various government departments are located in dispersed locations across the province, with relatively little oversight of local officials by senior bureaucrats in the provincial capital.

In 2011, the provincial health department collaborated with researchers to pilot a smartphone-based system that replaced the paper-based monitoring of facilities with data entry using smartphones. This system instantly transmitted the data it gathered to a website that updated detailed statistics and graphs using that data, as shown in Figure 1. This information became available to senior government officials, who were able to use it to provide feedback to local staff. As a result, staff performance on certain metrics doubled in many areas.

Figure 1: Punjab Health Department Data Aggregation Website



Besides improved information collection from government staff, ICT interventions can also allow the solicitation of information from citizens. The Citizen Feedback Model (CFM) is an ongoing project in Punjab that seeks to collect feedback on government service delivery from citizens who have recently been provided those services. It works as follows: when a citizen initiates a service request with a government officer in an area CFM is operative, the officer is mandated to collect identifying and contact information for the citizen (typically ID and cellphone). At the end of the day, a local technology officer collates this information for all services provided and feeds it into a government database. A central authority then calls or texts these citizens to inquire about the service provided. Aggregate feedback and individual messages flagged for attention are then sent to a senior local government official, who may use it to reward or sanction the original service provider.

ICT based monitoring can go beyond auditing service delivery to supporting critical institution building. In Afghanistan in 2010, Callen and Long tested a rapid vote count verification system. This worked as follows: the provisional vote tally at each voting station was photographed using smartphones, and compared to the vote totals returned by the station. This uncovered rampant vote counting fraud. The simple act of collecting this information, combined with an advance announcement that this would be done, resulted in substantially reduced vote count fraud.

Each of these examples illustrates a scenario in which information was productively aggregated and used to improve governance. Crucially, it would not have been viable to collect this information without using ICT infrastructure. Policy-makers considering designing their own information aggregation system should ask themselves the following questions:

- What information, if collected, would allow policy-makers to better monitor (and consequently punish or reward) the performance of their subordinates?
- What information, if collected from the public, would allow policy-makers to better match allocations to the public desire?
- How can this information be made actionable? Will the data trigger a mechanistic response? If not, who will have discretion over how the data is used?

## INFORMATION DISSEMINATION: GETTING THE MESSAGE TO THE PEOPLE

Policy effectiveness is often reduced because citizens do not have the right information at the right time. ICT allows rapid and high-frequency dissemination of information to citizens. This can be valuable for communicating information quickly in emergencies, for communicating actionable information in a timely manner in normal times, and for sustained and regular transmission of knowledge. Moreover, ICT platforms can both respond to citizen requests for information, and pro-actively push out information to citizens unsolicited.

Short Message Service (SMS) or Interactive Voice Response (IVR) Calls can reach virtually entire populations in a given geographic region very quickly. This can be used to provide emergency information. In Bangladesh, for example, cyclone alerts are sent out through SMS, and citizens thus alerted to seek shelter.

Additionally, both SMS and IVR calls can be targeted to specific categories or classes of people. The CFM project discussed above does this by using a recording of the Chief Minister's voice to address an individual using a script specific to a service, with a request to provide feedback. The language of the call can be localized as well. The ability to individualize messages at scale likely improves response rates.

Customized messaging can also be used to provide agricultural extension services. This can take the form of geographic targeting – pushing out pest alerts to farmers in an outbreak area, with recommended pesticide dosages for example, or an opt-in system. This messaging can also be two-way. For example, an Indian NGO successfully trialed a system in which specialized mobile phones were used to create Short Dialogue Strips (SDSs) or a combination of six images and two minute audio clippings. These phones were then used to communicate local agricultural problems faced by farmers to remote agriculture experts, and solutions proposed by the latter back to the former. An evaluation found that the induction of this technology caused farmers to increase the use of advice, that the positive impact was greater for disadvantaged farmers, and that farmers' openness to new technologies increased as a result.

Finally, Massive Open Online Course (MOOC) platforms such as Khan Academy are already providing support to education across the world. Many countries are engaged in efforts to localize such content for their contexts, and to use online classrooms not only to support student learning, but teacher training as well. At relatively little cost, governments can expand support for such programs, and adapt the technology to, for example, specialized mid-career courses for personnel too.

In designing information dissemination systems, policy-makers need to ask themselves these questions:

- What information needs to be communicated to general citizens or specific government officials?
- Is speed of communication important? Should the message go out at a specific time or after a certain event has occurred (such as after the citizen visits a public clinic)?
- How regularly should the information be conveyed?
- Should the information be provided unsolicited and pro-actively (more appropriate for building awareness or for time-critical messages), or should the citizen have to request the information (more appropriate for knowledge-transfer and other non-urgent messaging)?

### COMBINING AGGREGATION AND DISSEMINATION

When citizens individually have small amounts of information that would be more valuable if combined, ICT projects can incorporate both aggregation and dissemination activities to enable this. An example of this is an ongoing project that seeks to support citizen sharing of information about product quality.

Products, especially farm inputs, are often of very poor quality in developing countries due to high levels of quality adulteration, tampering and fraud in the absence of a well-functioning public quality assurance body. One solution is for citizens to share their experiences about the product in question.

In this case, the project requires the service provider to take the recipient’s phone number at the time of service provision and submit it to the system through a smartphone app. Either through a call or SMS, the recipient is then asked about the quality of service provision (in this case, they are asked whether the Artificial Insemination Technician or Veterinary Officer provided successful treatment leading to the client’s animal getting pregnant). Individual recipients’ responses are then aggregated, allowing the ranking of service providers by average quality. These rankings are then published to participating and external individuals (as described in Figure 2).

This makes it more likely for citizens to seek service from those officials who provide better quality service delivery, or to pressurize under-performing officials to improve supply. In the specific context it was evaluated, this project created a threefold rate of return on intervention cost, by improving the quality of supply.

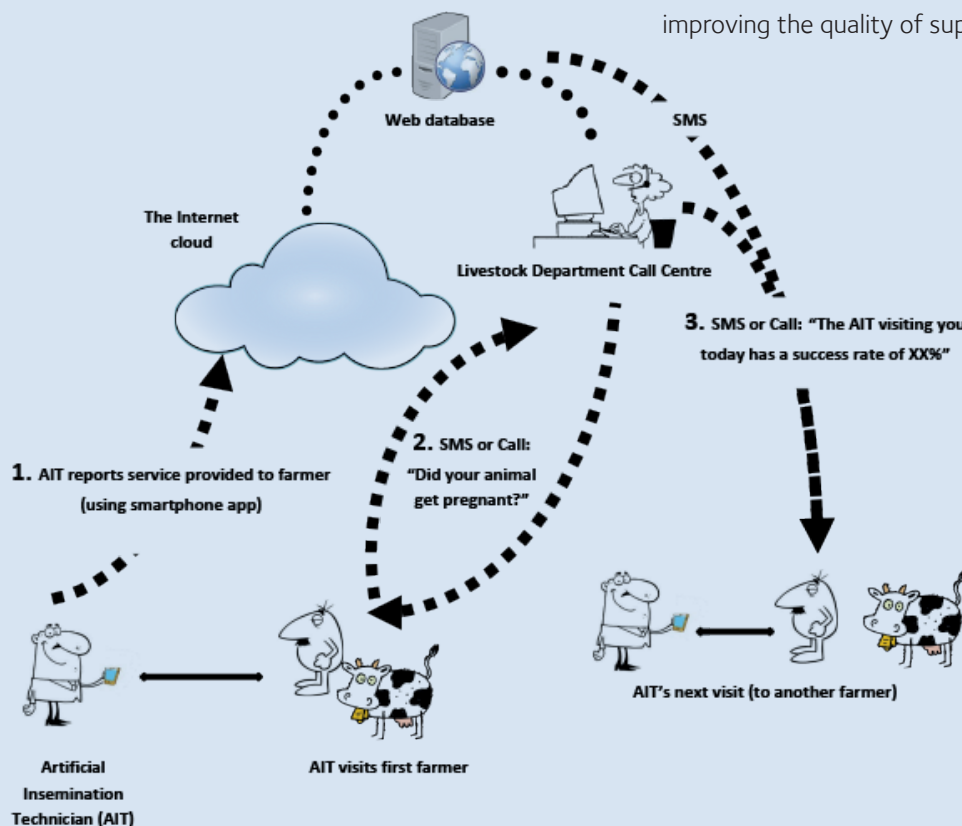


Figure 2: Aggregating and publishing data on quality of service delivery

### OVERCOMING CHALLENGES TO ICT-LED GOVERNANCE REFORM

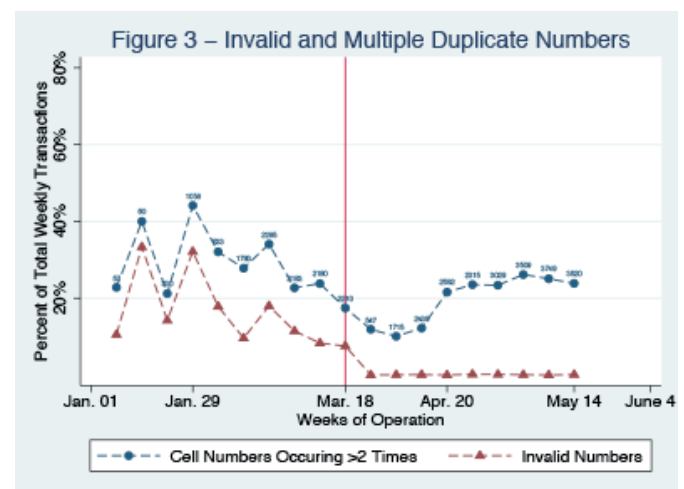
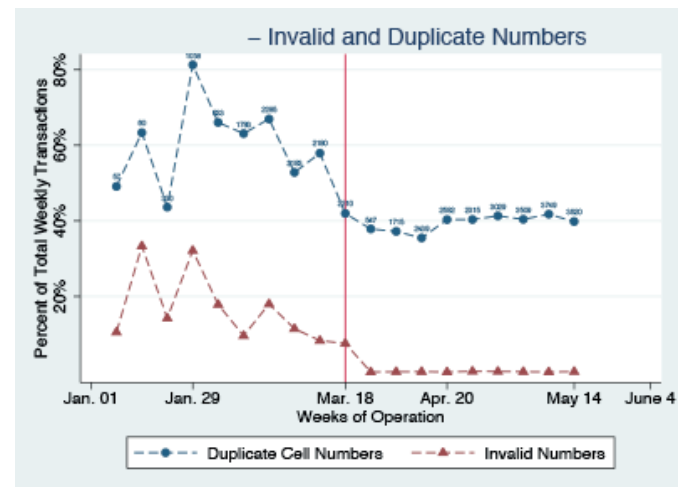
When designing an ICT-based reform effort, policy makers need to consider things that can go wrong.

First and foremost, the veracity of the data being received must be ensured. It is often not in the interest of local subordinate staff to report information truthfully, and they can try to subvert data collection in unexpected ways. An interesting example of this comes from the early implementation of the Citizen Feedback Model (CFM) discussed above, which aimed to contact citizens who had been provided particular government services in Punjab, Pakistan in order to receive their feedback about service quality and any instances of corruption. CFM required data to be captured by the same offices whose performance it sought to evaluate, and this created problems in its early implementation.

Until March 2010, CFM was not able to detect subordinate staff's submission of invalid numbers (i.e. a number sequence that could not technically be a phone number) instead of citizen contact information. When the capability to detect such practices was introduced that month, the provision of invalid numbers quickly fell to become negligible (as depicted by the decrease after March 18th in the red line in the figure on the left below).

However, the local staff then shifted to providing valid phone numbers, but often listing the same numbers for different citizens (as depicted by the rise in the blue line in the figure to the right below after March 18th). These numbers would typically be switched off when called, rendering the entire program pointless.

Figure 3: Detecting false data entry and respondent response



Although CFM staff detected this problem quickly and resolved it effectively, it neatly illustrates the fact that when data is collected by the same group that it can be used to sanction or reward, these groups may attempt to falsify this data to their advantage.

Second, even if data is being carefully collected and validated, it must be presented to senior officials in ways that highlight what is important. Choices regarding how data is processed and presented significantly impact how it gets used.

As an example, consider the screenshot overleaf. This depicts the way data was presented to senior government officials in a health-related ICT intervention in Punjab, Pakistan: each row of data represents information from a different facility and rows highlighted in red represent under-performing facilities. Empirical study demonstrated that by simply changing the color a particular row was presented in, this ICT platform changed how senior officials allocated their focus and actions. The viewer's attention is limited, so ICT platforms must not only be clear, but must also make choices about what information to emphasize more.

Figure 4: How data is presented impacts how it gets used

The screenshot shows a web interface for 'Recent Facility Visits'. At the top, there are navigation tabs: Compliance Status, Facility Status, Recent Visits (selected), Indicators, Time Trend Charts, Photo Verification, Map, Change Password, and Logout. Below the tabs, it says 'You are currently viewing: District A Block (Please click to change view)'. The main heading is 'Recent Facility Visits' with a red square icon and the text 'Visits highlighted indicate significant staff absence.' Below this is a search bar with 'Filter by Name' and 'Clear filter' buttons. A table displays the visit data:

Facility	Taluk	Visiting Officer	Date	PG	Other Absent Staff	Report Summary
BHU KANO	JAKO	DOO Jant	2012-07-11	Absent	LIN, SHIN,	
BHU BIRANGAI	HAZRO	DOO Hain	2012-07-11	Present	Computer operator,	
BHU HAS SHAN	ATTOCK	DOO Attock/Hassanabadi	2012-07-11	Present		
BHU THAP	JAKO	DOO Jant	2012-07-11	Present	Dispenser, LIN, SHIN,	
BHU DHURNAL	FAKTEH JANG	DOO Fatah Jang	2012-07-11	Present	Computer operator,	
BHU DAMYANUR	ATTOCK	DOO Attock/Hassanabadi	2012-07-11	Present		
BHU SOANDA	ATTOCK	DOO Attock/Hassanabadi	2012-07-11	Position Not Filled	Dispenser,	
BHU SHARABAD	HAZRO	DOO Hain	2012-07-11	Present	Computer operator,	

#### Highlighting Underperforming Facilities to Test Mechanisms

Third, policy-makers should avoid becoming over-reliant on information received through ICT systems. ICT systems almost always collect quantitative data, but policy-makers also care about outcomes that often cannot be distilled into a number, and hence reported through most ICT systems. Relying on the data available for rewards and punishment without supplementing with other forms of performance reviews would create perverse incentives amongst those evaluated, and must be avoided.

For example, former US Secretary of Education Rod Paige was credited with reducing dropout rates in Houston to 1.5% by making education administrators accountable for student performance. An investigation found evidence of incorrect coding, and estimated a true dropout rate between 25% and 50%.

Behavior that creates or condones such inaccuracies in the data is common in environments where subordinate staff are narrowly incentivized by quantitative data they contribute to collecting. Policy makers need to create ways to audit data generated through ICT systems, and carefully consider whether narrow, measurable incentives are not creating unintended consequences.

Fourth, a study of citizen participation in South Africa's 2014 elections found that the means of communication used in an intervention impacts who the average user is; specifically, easier methods of communication were found to include people more generally whereas harder methods were likelier to be used by people more motivated by the specific issue at hand. It is not enough to consider the content being communicated – the way it is delivered must also be carefully managed. Moreover, policy-makers must recognize that the target citizen's familiarity with the technology being used may impact take-up rates.

Finally, ICT interventions can go wrong when context is ignored and there is a lack of underlying demand for reform. A famous early example of an ICT-based reform effort that failed was a nurse attendance monitoring system set up in Udaipur in Rajasthan, India. This system used a stamping machine placed in the facility to record attendance. After a few months of early success at raising attendance, machines started getting sabotaged, and middle managers condoned the abuse of exemptions to the attendance system. A lack of senior bureaucrats' desire for reform meant that a technical solution could not survive for long.

Similarly, we discussed earlier the case of health official monitoring in Punjab, Pakistan, and described how an ICT-based intervention yielded a doubling of certain metrics. The caveat however, is that this impact was localized to constituencies with competitive politics, and yielded no impact elsewhere.

We can interpret both these cases to make a more general and simple conclusion: technology-based reforms can be very powerful, but only if there is an underlying *human* demand for change.

## CONCLUSION: FIVE KEY LESSONS FOR DESIGNING ICT INTERVENTIONS TO PROMOTE GOVERNANCE REFORMS

This brief discussed various ICT interventions that aggregate or disseminate data to citizens and highlighted challenges that policy-makers need to be cognizant of when designing new programs. At a minimum, five sets of guiding questions should be considered:

- Is a lack of information a major impediment to service delivery improvements? How can more information improve outcomes?
- Is the right data being collected? Who collects and reports the data? Could the data be erroneous because users are not sufficiently trained in the use of technology? Could the data be fraudulent because those who report it have conflicts of interest? Are there important outcomes that cannot be measured easily and thus reported in the data?
- What data needs to be provided to citizens? Should it be solicited or proactive, regular or occasional, immediate or scheduled? Is a response to be recorded and transmitted to decision-makers?
- Whose actions will the data collected inform? Will the response be predetermined action or will data use be discretionary for those who consume it?
- How will the data presentation be designed? What aspects of the data collected is it most important to bring to decision-makers' attention? What other sources of information will officials have? Will these sources allow a careful cross-examination of the data for authenticity?

The development of information and communications technology is happening at break-neck speed. This note did not touch upon Near Field Communications (NFC), autonomous drones, wearables, mobile payments, satellite imagery, the Internet of Things (IoT), Virtual Reality (VR) and a host of other developments that are being adopted rapidly in the developed world. Policy-makers in the developing world would be prudent to build partnerships between groups that understand the potential of new technologies and those that understand the needs and constraints of government. Happily, work in this area promises to be truly transformative in the years to come.



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