



Unlocking government

How data transforms democracy

Executive summary

The relationship between government and citizens is undergoing fundamental change. Around the world, government leaders are beginning to understand that unlocking public data can fuel new levels of performance. In many jurisdictions, data are now being viewed as public assets to be leveraged by citizens, businesses and communities.

The social media culture in particular is driving governments to open up, while offering the imagination and expertise necessary to improve public services. In response, government organizations are embracing the idea that public data should be broadly available in a reusable format and that governing should be a collaborative enterprise between government and its citizens. Leading governments are pursuing a range of initiatives aimed at making government more open than ever before.

These 'Open Gov' initiatives are largely focused on four areas: 1) Cataloguing sources of data; 2) Aggregating raw data into a single platform; 3) Encouraging users to develop nontraditional applications with government data; and 4) Mashing it up in ways that make it more meaningful to its consumers. Taken together, these initiatives are helping to make Government 2.0 a reality. Going forward, the key will be to use the lessons learned from these early initiatives to inform the next wave of the transformation taking place – the ways in which greater openness enhances mission performance.

In challenging fiscal times, governments are coping with the normal course of fiscal stress overlaid with a new set of extraordinary demands on their resources. Without closely tying open government principles to an organization's mission, it will be difficult to garner the senior executive support needed to drive the cultural change that is necessary to make government more open and collaborative, particularly in light of the cost reduction targets many governments have introduced.

The good news is that open government initiatives can help to engage the public in making the difficult budgetary choices governments are grappling with, while also offering a powerful opportunity to make government more open, more innovative, more responsive and smarter.

More open government: Make raw public data easy to access and manipulate

In their pursuit of increased "transparency and accountability," governments previously have focused mainly on improved public reporting of financial information and, where feasible, program outcomes. The unlocking of government through the release of raw transaction data represents a fundamentally new form of openness. It will place governments under an unprecedented level of scrutiny and accountability, while offering the potential to improve public services.

Most efforts to make government more transparent have not kept pace with advances in technology and social media norms. Governments have released information in hardcopy or put it online in formats that make the information difficult to access and integrate. This is changing. Governments are beginning to put large repositories of public data online. The U.S. Environmental Protection Agency's MyEnvironment website (www.epa.gov/myenvironment) gives users a snapshot of environmental conditions in their communities. The site draws on data from approximately 12 EPA databases with details on the compliance and violation histories of various facilities and on the volumes of chemicals those facilities have released.

More innovative government: Let the users design

Tapping the creativity of citizens allows governments to offer services that citizens want without further straining public resources. Governments can make vast stores of data available, at relatively low cost, and let users design innovative applications using public data. Recent government-sponsored competitions in Washington, D.C. and cities around the world are proving that citizens and businesses are willing and able to design new applications for public data. Whether to reduce crime rates, improve school scores or promote culture, users are designing tools for providing new data-driven public services.

One benefit to letting users design is that businesses and citizen groups do not feel the constraints that traditionally have made it hard for different agencies or jurisdictions to collaborate. In Australia, a nonprofit named Cambia has made just such a move through a project called Patent Lens (www.patentlens.net). Patent Lens is driven by the belief that the patent system can advance innovation only if information about which patents are in force is readily available. To open up patent information to the world, Patent Lens subscribes to patent databases held by the World Intellectual Property Organization, the U.S. Patent and Trademark Office and other similar organizations. The result – one of the world’s most comprehensive full-text searchable databases of patents.

While governments will always need to manage multiple information channels and services, they can now leverage talent and creativity from outside their boundaries to promote better knowledge, understanding and performance.

More responsive government: Tune into social networks to gain insight into the effectiveness of policies and programs

Data generated through social media interactions provide a previously untapped source of user feedback for governments on everything from service quality to programmatic changes, often in real-time. Governments are learning how quickly citizen-organized social media campaigns can provide focused input and meaningful data on proposed policy changes.

Consider the reaction to new legislation proposed by the Ontario government to set stronger conditions on young drivers. When the proposed legislation was announced, a group entitled “Young Drivers against New Ontario Laws” was created on Facebook. Two hundred people joined the group within hours. By the group’s second day, it had 14,500 members. By day four, that number had grown to 95,000. The group eventually attained more than 140,000 members. The Ontario government was not expecting the strength and speed of this online movement and, ultimately, amended the most restrictive provisions in the proposed legislation.

For government organizations to leverage the rich data that resides online, they need to mimic the social marketers that have come before them, proactively searching for structured and unstructured data on how citizens are interacting with public services.

Smarter government: Make data analytics a core competency

It is not enough to simply open up government data vaults for mass consumption; government leaders must position their organizations for success in an increasingly data-driven world. To increase the utility of public and online data, governments must develop the analytic capabilities to share and manipulate the data they collect, along with the increasing volume of unstructured data available online.

In England and Wales, police departments are using mapping technologies to understand and track crime trends in neighborhoods. Studies have shown that police perception of where crime occurs often does not match reality. By combining geographic data, census data, land use information, crime incident reports, crime initiatives and other sources of information, police officers create maps that provide much better intelligence than their own experience could provide. Police can use the maps to gain information on a single offense, multiple offenses of a similar type or a series of offenses that have become a major local crime problem.

Some areas of the public sector – security, defense, justice and revenue – are well ahead of their colleagues in learning to get the greatest possible value from the data they possess. But if unlocking public data is to have a truly transformative effect on how government works, data analytics will need to become a core competency across government.

Challenges moving forward

To transform by leveraging public data, governments will need to overcome a number of significant challenges. Privacy issues, for example, pose a significant and serious challenge. But the impetus to shift control of data from service provider to citizen is strongest in one area citizens consider very private indeed – their personal health. Here, many citizens are demanding and, in many jurisdictions, receiving access to personalized health information.

Citizens soon will start to expect similar access to personal information in other areas. As governments wrestle with how to provide secure, personalized data to citizens in a variety of areas, lessons learned in the healthcare sector will help them move forward.

Citizens well versed in social media expect data to be open, accessible and freely modifiable. They are highly sensitive to privacy concerns, but they recognize the need to balance privacy considerations with the benefits of collaboration.

Unlocking the stores of data currently sitting in government-owned and controlled silos will create the potential to improve public outcomes in nearly limitless ways. Government leaders have an opportunity to combine the resourcefulness of online citizens and entrepreneurs with the power of factual data to more effectively achieve their mission.

In an information-driven age, the ability of governments to seize this opportunity may ultimately spell the difference between success and failure.

Introduction

Since the census takers of early civilization, governments have been collecting data on citizens. Over much of that time, the primary users of publicly collected data have been limited to governmental entities and elite cadres of academics and researchers interested in government policy making. In more modern times and for a wider audience, governments produced statistical reports in prepackaged formats and charged users fees for standard reports and special data extracts. The repackaging of public information became a source of revenue for many government organizations.

By the late 20th century, governments began to use the Internet as a “single window” for public information and services. Information was prepackaged and tightly controlled, without much thought given to the best format for broad public consumption or to the ways data might be repurposed by its consumers.

Fast forward to today, and government leaders are beginning to embrace the fundamental principles of openness and collaboration that characterize the open source movement and underlie the concept of Web 2.0.

- On his first full day in office, President Barack Obama issued an executive memorandum that outlined the U.S. government’s commitment to providing an unprecedented level of openness and to establishing a system of transparency, public participation and collaboration. “Openness will strengthen our democracy and promote efficiency and effectiveness in government,” said Obama.¹ Other elected officials have expressed a similar governing philosophy.
- The UK government launched its “Smarter Government” initiative that includes an effort led by Sir Tim Berners-Lee to “make public data public,” in addition to putting collaborative mechanisms in place to enable greater interaction between citizens and civil servants. British Prime Minister Gordon Brown explains: “[I]ncreased transparency and accountability will enable citizens to compare local services, lobby for improvements, choose providers and demand changes in service delivery – with the Web as a powerful new tool for sharing customer experience – in the same way that social networking sites provoke debate and discussion and mobilise opinion.”²

- The Australian government is reviewing the Government 2.0 Taskforce’s recommendations that, among other things, encourage public servants to engage with their respective constituencies online and invite government agencies to create an environment in which employees are incentivized to do so. “Both politicians and public servants have to overcome an old and reflexive mistrust regarding the release of information,” says The Hon Lindsay Tanner MP, Minister for Finance and Deregulation, Government of Australia. “...[I]f the new technologies and ways of using them mean that government is in closer and deeper contact with the citizens it serves and is harnessing their best ideas, the government will only benefit.”³

Rather than view the changing relationship between government and its stakeholders as a threat or an inconvenience, public leaders increasingly see it as an opportunity to engage citizens, non-governmental organizations, businesses and other governmental entities in the design of new services and the resolution of old problems.

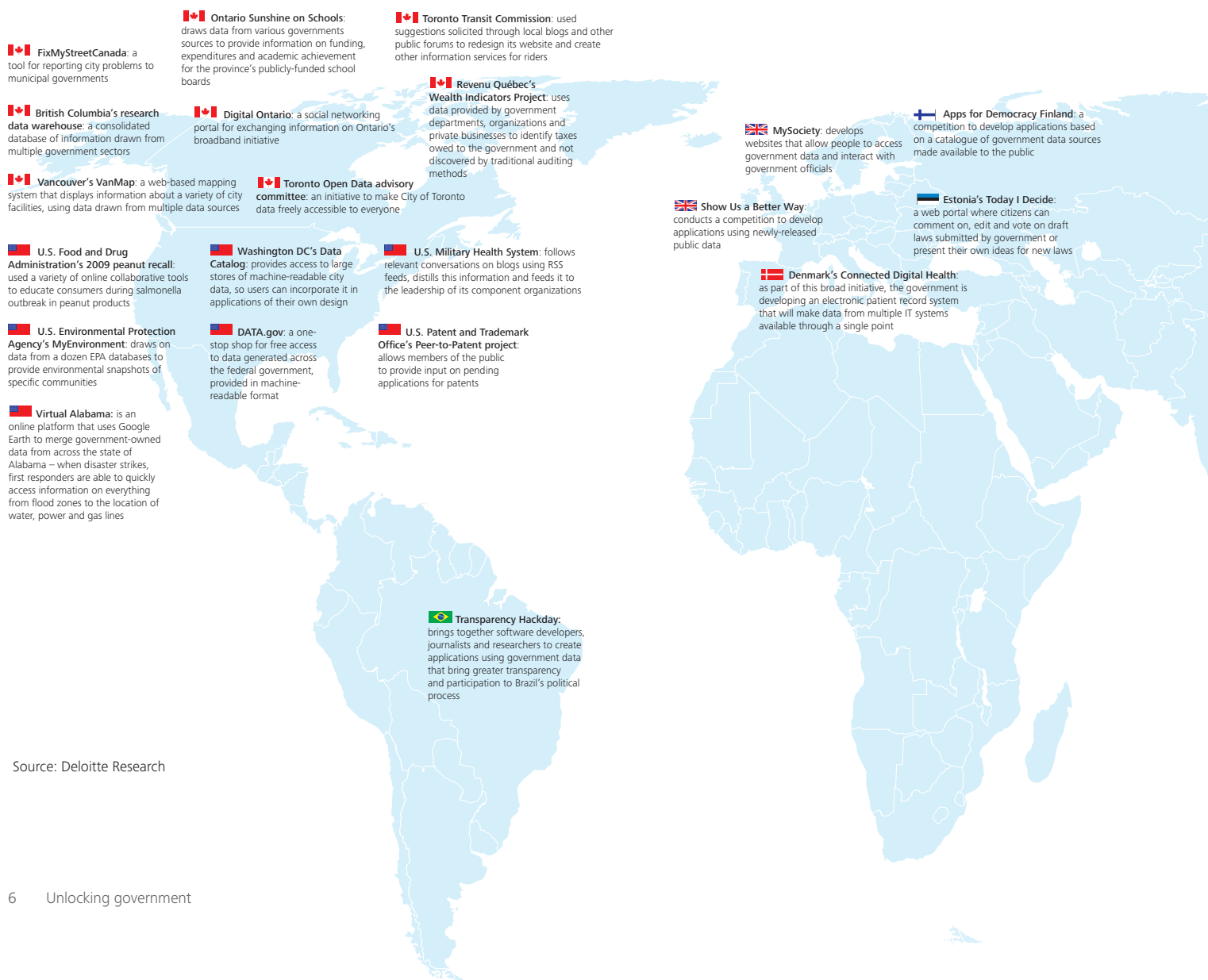


Public data are an increasingly important asset, which increases in value when it is shared broadly and made available in an accessible format. This fundamental tenet is taking root in government organizations across the globe (see figure 1). Some agencies have matured more than others in this area and the landscape is changing rapidly.

Early open government initiatives largely focused on four areas:

1. Cataloguing sources of data;
2. Aggregating raw data into a single platform;
3. Encouraging users to develop non-traditional applications with government data; and
4. Mashing it up in ways that make it more meaningful to its consumers.

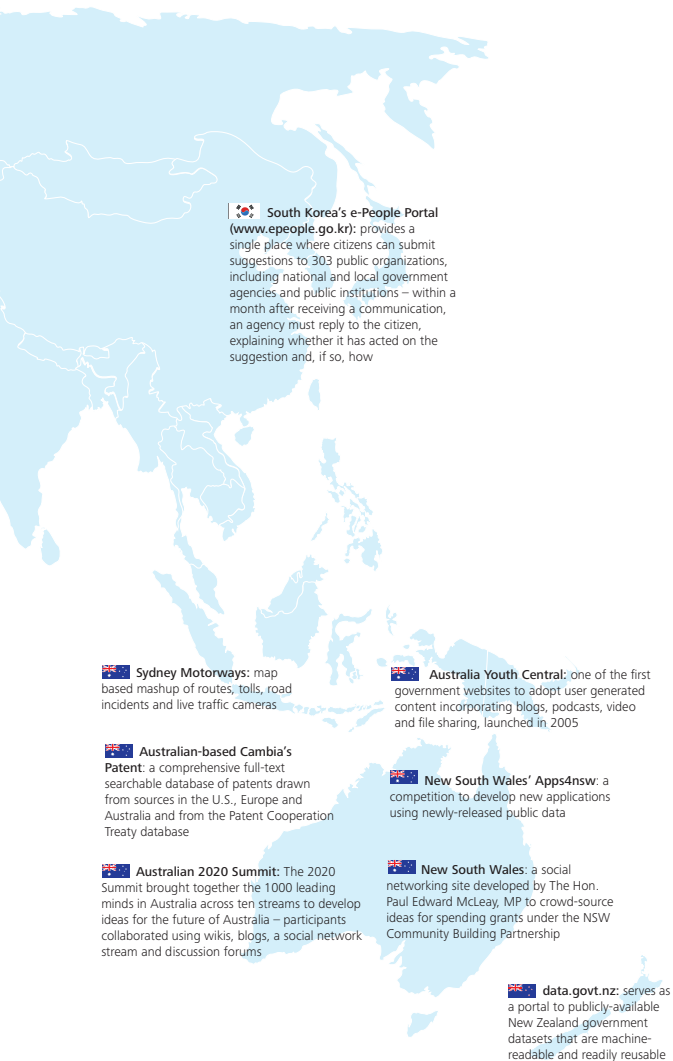
Figure 1. The global unlocking of public data



Source: Deloitte Research

Taken together, these initiatives have helped to lay the groundwork for more open government. Going forward, the key will be to use the lessons learned from these early initiatives to inform the next wave of the transformation, which must emphasize the ways in which openness enhances mission performance.

Open government initiatives offer a powerful opportunity to make government smarter and more open, innovative and responsive. However, without closely tying open government principles to an organization's mission, it will be difficult to garner the needed support from senior executives to drive the cultural change required to make government more open and collaborative, particularly in light of the fiscal strain with which many government organizations are confronted.



This report examines the growing role of public data in transforming how governments set policy and serve citizens. Drawing on efforts by governments and citizen groups to increase the utility of public data, the report illustrates the evolution of government from a data publisher to a development platform for generating maximum public value. It demonstrates how unlocking government can realize the following four benefits:

- **Open government:** by making raw public data easy to access and reuse
- **Innovative government:** by encouraging the public to design its own applications to harvest value from public data
- **Responsive government:** by tuning into social networks to gain insight into the effectiveness of policies and programs
- **Smarter government:** by making data analytics a core competency

We also explore the capabilities that government organizations need to cultivate to adapt to an increasingly data-driven world, as well as overcoming the challenges in unlocking government information.

We start with a look at how government organizations are beginning to embrace a fundamentally new principle of openness.

More open government

Make raw public data easy to access and reuse

In their pursuit of increased “transparency and accountability” over the past decade, Western democracies have been focused mainly on improved public reporting of financial information and, where feasible, program outcomes. The unlocking of government through the release of raw transaction data represents a fundamentally new form of openness that will place governments under an unprecedented level of scrutiny and accountability, while offering the potential to improve public services.

As advances in technology give governments the ability to store and transfer massive amounts of information, pressures are increasing for agencies to open large stores of data to the public. In the U.S., for example, the nonprofit group OMB Watch has spent years calling for more open government. National chapters of Transparency International, a Berlin-based nonprofit dedicated to fighting corruption worldwide, work to increase accountability and transparency in the countries where they operate. Much of the information being sought has existed within governments for years. In many cases, governments have provided portions of these data in hardcopy, microfiche or PDF form, typically as part of their program reporting and information services or in response to freedom of information requests.

For the most part, governments' approaches to transparency have not kept pace with advances in technology and social media norms. Requirements that data and information be made public have typically meant only that they be accessible somewhere in hardcopy. In other cases, governments have put data online but dispersed the information across numerous agency websites. Moreover, the data are often in formats that are not directly compatible with each other or that make the data difficult to analyze and manipulate. All of this makes it difficult for interested citizens or agencies to extract useful knowledge from the raw data. It also makes it hard for citizens to find sources for the data they want or even to find out that such data are available.

To appreciate how access to public data promotes good government, consider the parliamentary expense scandal that rocked the United Kingdom in 2009. The controversy started with a series of attempts, by journalists and others under the country's *Freedom of Information Act*, to get Parliament to release details of expense reimbursements to its members. After a long, legal struggle and a ruling by the English High Court in May 2008, the House of Commons agreed to publish a full list of the expense claims in July 2009, withholding only certain items that were considered too sensitive for publication.

Before that list saw daylight, however, the newspaper *The Daily Telegraph* obtained a leaked copy and began publishing the information in installments. Citizens were outraged by what they read. Although the law allows Members of Parliament to claim expenses related to a second home that the member maintains in order to conduct business in London, many claims on the list have been called into question since its publication. In June, a month earlier than originally promised, the House of Commons published the list of expense claims.

If the United Kingdom had put its database of members' expense reimbursements in the public domain in the first place, could the scandal have been avoided? Politicians who know that constituents are watching their activities are much more likely to be careful about how they spend public funds.



Four benefits of embracing “the new open”

1 Better inform the public

Many citizen-led organizations, primarily nonprofits, are designing applications that individuals can use to access and manipulate government data. The Sunlight Foundation, for example, provides citizens with improved access to existing information, digitizes new information and creates tools and websites that allow citizens to collaborate in fostering greater transparency. The organization has launched a number of websites, including: OpenCongress.org; FedSpending.org; OpenSecrets.org; EarmarkWatch.org; and LOUISdb.org. At OpenCongress.org, for instance, a visitor can learn how much each member of the U.S. Congress received in political contributions from various interest groups, view the bills that member has sponsored, read up on proposed legislation, contribute to wiki articles about Congress and a great deal more. Many other groups are committed to similar activities and governments are responding by providing them with more data to use.

2 Enhance accountability

Besides making raw data available to the public, governments are also creating applications that extract data from one or more sources and present it to the public in a form that a non-expert can understand. Government-designed applications offer a valuable complement to applications that citizens and non-governmental entities create with public data. They are more valuable when they offer the user a choice – either to view data through the filters and lenses the government provides or to download raw data and incorporate it into other applications.

One important category of government-designed applications focuses on accountability. Drawing from data on government spending and program performance, these applications let constituents see how the government is using taxpayers’ money and how well it is living up to its promises.

Often, these sites let users choose the kind of data they want to see and the filters they want to apply, for example, “How much money has the U.S. government’s economic stimulus program made available for construction projects in Clark County, Nevada and what are those projects?” Bar and pie charts, maps and other graphic displays make it easy for viewers to absorb the data, make comparisons and draw conclusions.

One of the most ambitious examples of a government accountability website is New York City’s Citywide Performance Reporting (CPR) site (www.nyc.gov/html/ops/cpr/html/home/home.shtml). Launched in 2008, this application gives citizens access to approximately 300 performance measures for more than 40 city agencies. City officials may also use CPR to get quick access to information that can help them run the city more effectively.

3 Strengthen communities

Public data sources can also be used to provide information on many different aspects of a community or other jurisdiction – demographics, criminal activity, real estate values, transportation resources, natural features, public health and a great deal more. One example is Community Accounts (www.communityaccounts.ca), developed by the Government of Newfoundland and Labrador. The first Internet-based data retrieval and exchange system in Canada to provide unrestricted access to view and analyze government data, it provides information on economic, demographic, justice, religious, and other indicators for all of the provinces of Canada, as well as for communities and neighbourhoods in Newfoundland and Labrador.

In the U.S., the Environmental Protection Agency's (EPA) MyEnvironment website (www.epa.gov/myenvironment) gives users a snapshot of environmental conditions in their communities. The site draws on data from approximately 12 EPA databases with details on the compliance and violation histories of various facilities and on the volumes of chemicals those facilities have released. It also provides links to other EPA tools that offer information on, for example, water and air quality.

4 Facilitate markets

Governments collect vast volumes of information on businesses and nonprofit organizations that they track or regulate in some fashion. These data can help constituents make decisions about where to obtain products and services. Providing open access to performance data – outcomes at hospitals, results of health inspections at restaurants, airlines' on-time performance, school districts' achievement scores – and the like – also spurs service providers to perform better and compete harder.

For air travelers, the U.S. Department of Transportation's Airline On-Time Statistics and Delay Causes tool (www.transtats.bts.gov/OT_Delay/OT_DelayCause1.asp) provides insight into the airlines, with data available by airline, airport and time period. The information gives travelers information they can use in choosing an airline and helps them understand the full range of factors – those related to weather, as well as to airline operations – that may delay flights.

Data clearinghouses

Data clearinghouse initiatives provide the broadest sort of access to data, with little mediation by the government. The government creates a large repository for public data or a catalogue through which users can access data from multiple sources. Anyone with the necessary skills and tools can incorporate this raw material into any sort of application. Indeed, governments that develop these data access portals are actively encouraging individuals to use the data in applications, sometimes by means of competitions with cash prizes.

The District of Columbia was the first government to systematically open large amounts of data to the public, starting in 2007. Its Data Catalog (http://data.octo.dc.gov/Main_DataCatalog.aspx?id=316) provides more than 200 data sets that can be mashed up to provide insights on crime, properties, construction projects, businesses and much more. The data are available as a live feed or for download.

By providing data in raw form, this website has helped to set the standard by which open government initiatives are judged. The success of the Data Catalog initiative served as the inspiration for a federal initiative in Washington called DATA.gov (www.data.gov) that former Chief Technology Officer for the District of Columbia, Vivek Kundra, helped to launch in May 2009, in his new position as President Obama's Chief Information Officer. DATA.gov provides a "one-stop shop" for free access to data generated across all federal agencies.

From legacy to leading

Governments around the world are beginning to redefine “transparency” to embrace a new form of openness that involves releasing vast stores of public data for citizens to

explore. On the journey from legacy to leading practices, they are learning about the changes to strategy, culture and access that are needed to succeed.

Table 1. More open government

	Legacy	Learning	Leading
Strategy	<ul style="list-style-type: none"> Compliance with legal obligations (such as freedom of information laws, other government reporting requirements) Standard structured performance reporting (such as annual reports that outline expenses and results) 	<ul style="list-style-type: none"> Pockets of organizations sharing select data Fragmented approach without a systemwide or centralized strategy Primarily concerned with providing more data through internally designed applications intended to improve service 	<ul style="list-style-type: none"> Agency-wide strategy and policy of providing open access to data Actively promoting (in media and online) government openness Encouraging citizen participation and engagement
Culture	<ul style="list-style-type: none"> Data is made accessible as required or in response to unavoidable public pressure (for example, from political scandals over travel expenses) Default position on data is that they are not shared unless they need to be 	<ul style="list-style-type: none"> Cautious approach to data sharing – still concerned with avoiding full accountability and potential embarrassment Officials keep coming up with reasons NOT to share data, rather than reasons to share them 	<ul style="list-style-type: none"> Belief that unless there is a specific and legitimate reason for not doing so, data should be made available to the public Culture of improved transparency and accountability driving more effective policies
Access	<ul style="list-style-type: none"> Data are owned by government Data provided on static websites Updated infrequently (for example, annually) Read-only formats from which data cannot be parsed 	<ul style="list-style-type: none"> Data are owned by government Structured data provided selectively through interactive online applications (such as maps combining geographic data with land zoning information) Data sets updated more frequently (monthly, weekly or sometimes in real-time) Absence of raw, machine-readable data 	<ul style="list-style-type: none"> Data are viewed as a public good Centralized, organized access to government data Data updated very frequently, often in real-time Some applications are designed, but the primary focus is on providing access to raw, useful data that citizens can use to design applications

Lessons in execution

Even though we are early in the evolution of unlocked government, some lessons are beginning to emerge:

- **Data should be easily accessible online.** In today's world, open access to data means that they should be easy to find. Governments that have been most successful in this movement are creating Web-based portals to provide access to all of their data. Leaving data spread over hundreds or even thousands of websites makes it very difficult for users to unlock the value that exists in combining previously disconnected data stores.
- **Data need to be offered in accessible formats.** One of the biggest challenges that citizens face is that data is often provided in legacy formats that are difficult to work with. Providing access to data via a "data mashup" is better and can be very useful, but not as useful as also giving the user the option of obtaining the data in their raw form. If the government provides access to new information through an interactive map, for example, users should also be able to parse the actual raw data (to reuse it in a new application) from this source. The EPA's MyEnvironment site does exactly this, allowing the user to download the data behind its interactive maps in several formats.

- **Collaboration between government agencies is important.** Citizens want to combine data from different agencies and programs. Public leaders should expect their data to be combined with data from other sources and used in unique and novel ways and should approach the prospect in a spirit of collaboration and creativity.
- **Governments should be open about being open.** Agencies should not quietly put data online. Rather, they should tell the public what they are doing and why, while seeking their participation and engagement. Data that sit in a file are not worth much. Information becomes powerful only as its consumers start to apply it in ways that create value.



More innovative government

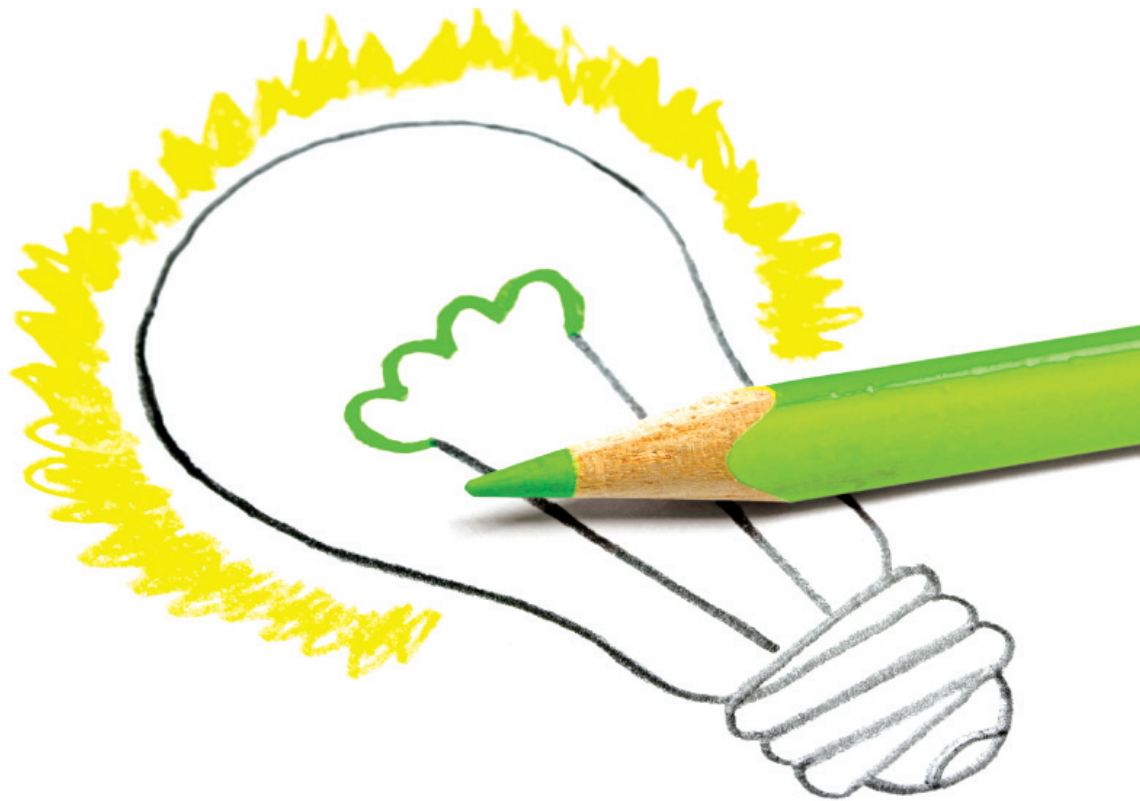
Let the users design

Recent competitions in Washington, D.C. and cities around the world are proving that citizens are willing and able to design new applications for public data. Leading governments are encouraging citizens to invent new ways of applying public data to today's challenges and citizens are responding. Whether to reduce crime rates, improve school scores or promote culture, citizens are designing tools for providing new data-driven public services. While governments will always need to manage multiple information channels and services, they can now leverage talent and creativity from outside their boundaries to promote better knowledge, understanding and performance.

With more than nine million articles in 10 languages, Wikipedia stands out as a compelling example of what can happen when online users are encouraged to collaboratively design, create and update content on the Web. The many other sites that have flooded into the social networking marketplace provide popular examples of spaces where content design is left almost entirely up to the user: YouTube, MySpace, Facebook and Twitter are just a few examples.

This form of user-driven application development, also known as crowd sourcing, user innovation or open sourcing, provides governments with an unprecedented opportunity to engage citizens in unlocking the power of public data.

Governments no longer need to be the sole arbitrator in deciding what data are important to users or how they should be presented. Now, governments can make vast stores of data available, at relatively low cost, and let users design innovative applications.



Four ways to drive innovation by letting users design

1 Tap the creativity of citizens

Tapping the creativity of citizens provides a tremendous opportunity for governments to offer services that citizens want without straining their resources. Why use internal resources to develop a transit trip planner, a tool for reporting potholes, a map that indicates available parking spots or a host of other useful applications, when volunteers stand ready to develop such services for free? Not only do citizens develop applications that governments might have created themselves, if they had the time and money, but citizens often dream up uses for public data that government agencies have never contemplated.

The Toronto Transit Commission (TTC) didn't start out to play that role. But when transit patrons urged the commission to improve its website with help from citizens, the TTC rose to the occasion.

Created in 1997 and virtually unchanged since then, the TTC's website (<http://www3.ttc.ca>) was difficult to use, according to bloggers in 2006. Riders had a tough time finding maps and schedules on the site, which made trip planning a time-consuming process. One blog entry on the Reading Toronto website called the TTC's site "the single worst information site anywhere."⁴

In January 2007, TTC chair Adam Giambrone took up a challenge to take suggestions from bloggers on how to improve the site. Four blogs in Toronto started collecting input from their readers. *CBC Radio*, *National Post*, *The Toronto Star* and *The Globe and Mail* featured stories on the challenge and directed readers to the blogs. After three weeks, the blogs collectively sent an open letter to Giambrone, summarizing readers' suggestions and asking that the TTC reopen its request for proposals for a new website to incorporate those ideas.

Not only did the TTC accept help from the blogs, but it conducted surveys and sponsored activities to solicit public input, including two "Transit Camps," where TTC riders got together to brainstorm ideas for better service.

While riders were waiting for TTC to incorporate their ideas in its new site, some of them developed sites of their own to capture whatever transit data they could and present it in a useful format. One example is www.myttc.ca, which provides a trip-planning tool.

In June 2008, the TTC launched a new website that proved easier to navigate than the old one and offered a wide variety of maps. Many improvements to the site and to other information services for transit riders, came from suggestions collected in the blogs and other venues. For example, the TTC has added a webpage that alerts customers to disruptions in subway service and a series of "next train arrival" signs have been going up at subway and rapid transit stations.

2 Break down government silos

Many governments are constrained by a culture of information control that makes it difficult to push the boundaries. One benefit to letting citizens design is that citizens, unlike governments, do not feel the constraints that traditionally have made it hard for different agencies or jurisdictions to collaborate. If several transportation agencies wanted to build a trip-planning tool that covered a wide geographical region and multiple transportation modes, before anyone wrote a line of code they would spend months wrestling with questions of data ownership, process governance, resource allocation, liability and a host of other issues. However, if the agencies opened the necessary data to the masses, an independent third party could develop the cross-cutting application much more quickly.

In Australia, a nonprofit agency called Cambia has made just such a move through a project called Patent Lens (www.patentlens.net). Cambia's mission is "to democratize innovation – to create a more equitable and inclusive capability to solve problems using science and technology." Cambia was founded by Professor Richard Jefferson, an American-born molecular biologist working in Australia who champions the principle of open source in the life sciences.

Patent Lens is driven by the belief that the patent system can fulfill its mission to advance innovation only if information is readily available about whose patents are in force over which technology and where. Unless the patent system is transparent, Patent Lens posits, people will unwittingly infringe patents they do not know about, avoid areas of innovation in which they are entitled to be creative or make poor investments based on incomplete information.

To open up patent information to the world, Patent Lens subscribes to patent databases held by the World Intellectual Property Organization, the U.S. Patent and Trademark Office, the European Patent Office and IP Australia. The result is one of the world's most comprehensive full-text searchable databases of patents. Patent Lens currently provides access to information on more than eight million patents. Although similar services are available for a fee, Patent Lens is the largest free service of its kind.

Another nonprofit organization breaking down the boundaries between governments' IT systems is the Canadian group VisibleGovernment.ca (<http://visiblegovernment.ca>). The organization is developing a tool called the Expense Visualizer, which will give users access to data on government officials' travel and hospitality expenses. The Canadian government has made this information available online since 2004, but not in a form that is easy to access and analyze. According to VisibleGovernment.ca, the information is spread over 124 department sites, all publishing the data in "subtly different formats." The Expense Visualizer will scrape the expense data from federal websites and put it in a common, machine-readable format so external tools can access it through an API. Working with Datalicious, a data visualization firm in Montreal, VisibleGovernment.ca is creating a tool that will let users compare expenses by department, individual or time period.

3 Generate healthy competition

The private sector has been leveraging the power of citizens to analyze data for several years. Goldcorp, a Toronto-based mining company, ran one of the best-known crowd sourcing competitions by opening the company's proprietary data to the public and offering prize money for the best estimates and methods for finding gold deposits in their mines. The contestants identified over 100 targets, more than 80 percent of which yielded substantial quantities of gold. Competitions to encourage citizens to produce value from data continue to flourish across the private sector. Now, governments have begun to follow suit.

The District of Columbia has led the way in showing how governments can harness the collective talents of their citizens by encouraging them to design applications based on data it has placed in a catalogue. According to Vivek Kundra, the District's former Chief Technology Officer when the Data Catalog was first developed, citizens designed uses for the government's data that government officials never would have contemplated on their own. In the 2009 competition, for example, the first-place winner combined iPhone access and a Facebook application to allow users to submit requests for fixing potholes, broken parking meters and other problems. Users employ the iPhone's camera and global positioning system capabilities to document the location and nature of the problem. In return for their contributions, winners receive both public recognition and cash prizes.

While the District of Columbia holds competitions to encourage people to create applications based on its data, in the case of DATA.gov, the push to make creative use of federal data is coming from a citizen source, the Sunlight Foundation. That organization has launched a contest – called Apps for America 2 – to find the best applications for DATA.gov. The foundation selected the following three winners: GovPulse.us, a tool for browsing the Federal Register, the official journal of the federal government; ThisWeKnow.org, a tool for finding federal data connected with a specific local community; and Datamasher, which allows users to mashup data from two different public data sources, such as obesity vs. household income.

In the U.K., the government has launched a website, www.showusabetterway.co.uk, that provides centralized information on new data that it is providing to the public as part of its Power of Information initiative. It is also using the website to run a competition seeking new ideas from the public for using this information. In Finland, the Apps for Democracy Finland competition held in 2009 garnered 23 submissions, including 12 working prototypes and 11 ideas for using public data. The Government of New South Wales in Australia is holding a similar competition, called apps4nsw, based on a catalogue of public-access data sets that it is making available.

4 Change the culture

Governments that make their data available for unlimited use by citizens also benefit by triggering a change in their own data culture. As Greg Elin, chief data architect at the Sunlight Foundation, told *The Atlantic*, a government that develops an API for public use must record and store data differently than it did in the past. “Data sharing is no longer an afterthought,” he said. “You begin with the notion that you’re going to share information and you’re going to make it easy for people.”⁵ When government officials start treating their data as a public resource, opportunities to empower and collaborate with citizen developers multiply.

Make it as easy as possible for citizens to develop applications

Officials with the City and County of San Francisco have concluded that it is not enough to make raw government data available to the public; it also is important to provide tools that encourage application development. In developing DataSF (www.datasf.org), a central repository for machine-readable city data, these officials decided to provide an open source, easily-replicated standard API and platform for data distribution. Using Craigslist, the city solicited a group of developers and other volunteers who are using a wiki to plan and develop the solution. According to Kelly Pretzer, project manager for new media, IT and clean technology in the Office of Economic and Workforce Development for San Francisco, the plan is to “methodically liberate data from city departments and, in six month’s time, host cleaned versions in a standardized API in an open source, duplicable central repository framework.”⁶ When the data are available, project members will hold “Dev Camps” pegged to the interests of citizens and the needs of the city. Planners will solicit feedback on the project both online and in community meetings. When the platform and project are complete, any municipality will be able to use it, free of charge.

From legacy to leading

Governments are starting to wake up to the idea that when citizens use public data to develop applications that citizens want, they enhance democracy and make it possible to provide a broader, richer range of services at minimal cost. Leading governments are actively encouraging citizen-developers to get involved,

conducting outreach campaigns and, sometimes, contests to stimulate interest. They provide as much useful data as possible in open formats, sometimes also providing tools to simplify the task of incorporating the data in applications. They enlist the help of citizens in deciding what data to provide and in what formats.

Table 2. More innovative government

	Legacy	Learning	Leading
Strategy	<ul style="list-style-type: none"> No coherent strategy There is a general lack of awareness of user-designers' potential to add value to the organization's services 	<ul style="list-style-type: none"> Government is beginning to realize that users can add value Government makes selected data accessible in order to encourage user design 	<ul style="list-style-type: none"> Government recognizes the power of user-designed applications and develops strategies for capturing their potential (such as mashup competitions) Organizations make an effort to provide as much useful data as possible
Culture	<ul style="list-style-type: none"> Top-down approach to providing services to the public Ideas for service provision are internally generated and implemented Response to public input is reactionary (that is, service changes as a result of public backlash) 	<ul style="list-style-type: none"> User design is viewed as something that can add value and improve service, but is still seen as peripheral to the organization's objectives What users create can add value as an accessory 	<ul style="list-style-type: none"> User design is seen as something that can fundamentally improve service and solve problems User design is allowed to shape how information is provided to the public
Access	<ul style="list-style-type: none"> Data is owned by government and used internally to design services The public does not have access to information that would allow user-designed services to add the most value (for example, transit route data are unavailable to those who would like to design mashups) 	<ul style="list-style-type: none"> Data is owned by the government and is selectively provided to users Government primarily determines what is provided, with users often desiring more than what is available 	<ul style="list-style-type: none"> Data is still technically owned by government but extensive efforts are made to provide as much of it as possible to users Governments and users jointly determine what data is available – users make requests for data; government organizations actively listen to these requests and try to provide what is desired

Lessons in execution

The power of users in designing social media applications is now well established. Applying this power as a means to transform government from an information provider to a true development platform is a vast new frontier. In charting the way forward, governments should consider the following four important lessons:

- **Encourage users to create applications.** The objective is to promote user-driven applications for newly released data stores. Although contests can be useful, users don't always need competitions to contribute. Most citizen applications have been developed independently of government competitions. Users develop these tools because they want to. The most important variable is access.
- **Incorporate or adapt user-designed applications into publicly-hosted sites.** Applications that may have been developed for specific audiences, such as iPhone users, are often adaptable to broader audiences. An example would be anyone using a mobile phone or Web browser. Government organizations should be on the lookout for citizen-driven applications that appeal to a wider audience.
- **Seek and maintain a dialogue with apps developers.** The most useful applications of public data may be created when governments connect with users to understand what they are trying to see in the data. Governments will have knowledge of where data sets reside and what further sources could be unlocked to achieve greater value. Leading governments are creating advisory groups to assist with unlocking data stores. These groups bring leading social media participants together with community, business and government leaders to help guide decision making and action.

At TriMet's developer resources site, <http://developer.trimet.org/>, users can get access to transit schedule data to create applications that meet their own needs. Currently, developers can obtain a schedule published in the Google Transit Feed Specification (GTFS) format and Web services from TriMet's TransitTracker and trip planner systems. Users have designed numerous applications that use the data provided.

TriMet's website lists 28 applications that third parties have developed with its data, including apps for Web browsers, Google Gadgets and a variety of mobile platforms. Some examples: iNap, an iPhone app that sounds an alarm as a transit rider nears his destination; Public Transportation Stop and Service Finder, a Web browser app that displays all public transit stops and routes within a specific geographic location; and PDXT.org, which provides transit arrival information on phones with text messaging.

- **Create methods and channels for listening and responding to user demands for data.** Formalizing the channels for data interaction will help accelerate the process and create an avenue for further collaboration.

More responsive government

Tune into social networks to gain insight into the effectiveness of policies and programs

Companies whose products and services perfectly match the needs of their customers do not reach that level of excellence simply by responding to customer complaints. Nor do those companies develop their products and services in isolation from the people they serve. Top companies anticipate customer needs and proactively solicit customer input to refine their product and service offerings. To do this more cost effectively, companies increasingly are turning to social media. Using the online channels that their customers visit regularly, companies directly engage with their customers and also monitor what people are saying about their brands. Moreover, companies make use of the service advantages that accompany social media, allowing them to share granular level service advice in an extremely rapid fashion to hundreds or thousands of people. By solving a single customer's problem and broadcasting the solution over the Web, companies are able to resolve similar issues that other customers maybe facing, thus reducing the volume of related calls coming into their call center. They also have learned that social media sites can provide rich, publicly-available data on what people are thinking about their products and services.

Proctor & Gamble, for example, has been exploring the most effective ways to connect with customers via social media. The idea is to actively seek out consumers in the Web 2.0 universe rather than passively waiting for them to find information about P&G's products. "If they're not on our brand sites, that's okay," said Susan Ross, a P&G brand manager. "We will be able to follow them wherever they are and be part of their conversation."⁷ P&G has developed a Social Media Lab (www.pgsocialmedialab.com/login/), which it calls "a virtual R&D program, designed to actively explore and gain insights on how to build relationships with P&G's consumers in the age of social media."⁸

Products are starting to emerge that allow companies to monitor conversations across numerous social media sites to learn what people are saying about those companies and their products. Visible Technologies, for example, assists organizations in managing their online reputation by providing an aggregated view of the online social landscape in real-time.

In some ways, government organizations responsible for delivering programs and services are very much like companies trying to maintain close relationships with customers. They, too, need to understand their customers' needs and learn what citizens think about their "products" – their policies and services.

Data generated through social media interactions provide a previously untapped source of user feedback for governments, often in real-time. Citizens today spend a significant amount of time on social media sites. An international survey conducted by Nielsen found that

two-thirds of Internet users visit at least one social networking or blogging site as part of their Internet activity, making "member communities" the fourth most popular activity on the Internet.⁹

While "one-window" approaches to providing information on public services were sufficient in the early days of e-government, today's leaders need to do more than passively wait for public enquiries or complaints. They need to tune into social networks as a growing source of citizen data on everything from service quality to programmatic changes.



Five ways to increase responsiveness by tuning into social networks

1 Take the pulse

The Internet is a rich source of data about what citizens think about government activities and an important place for citizen-activists. New tools are emerging to make it easier to observe and participate in citizen discussions on any given topic.

The Military Health System (MHS) – (www.health.mil), which is responsible for the health of personnel serving in all branches of the U.S. military, is using social media to gather input on its policies and programs. MHS and its component organizations use a broad array of social networking channels to disseminate information about health and health care services and to promote a dialogue with military members. It follows relevant conversations on numerous blogs using RSS (Real Simple Syndication) feeds. MHS then distills information from these feeds and disseminates it to the leadership in the component organizations through a mechanism it calls the Blog Pulse Check.¹⁰

For local governments, one available tool for taking the pulse of the community is the website Happn.in (www.happn.in). Created by software consultant Jay Boyce and website designer Matthew Latkiewicz, this site helps users locate postings on Twitter that relate to specific topics. Happn.in monitors popular phrases that appear in posts from locations within 20 miles of major cities. Each hour, it chooses the ten most popular phrases for each city and collects the tweets that contain them. Four times a day, it posts those tweets to its website. On September 17, 2009, for instance, at 10:37 Pacific Daylight Time, Happn.in included the following comments about the new rapid rail service in Vancouver, B.C.: “I wish my 350 buses would come back!!” “Arriving at YVR airport via the Canada Line skytrain. Woohoo far better than an overpriced taxi.” “Let’s just see what people think of the Canada line when YVR tacks on the \$15 charge. Will they still like it for their trips.”

2 Obtain real-time feedback on policy

Governments are learning how quickly citizen-organized social media campaigns can provide focused input and meaningful data on proposed policy changes.

In November 2008, the Ontario government introduced new legislation to set stronger conditions on young drivers. The legislation proposed that a teenage driver could have only one teen passenger; a young person who received one speeding ticket could potentially lose his or her license; and young people would not be allowed to drive with any level of alcohol in their blood. When the proposed legislation was announced, a group entitled “Young Drivers Against New Ontario Laws” was created on Facebook. Two hundred people joined the group within hours. By the group’s second day, it had 14,500 members. By day four, that number had grown to 95,000. The group eventually attained more than 140,000 members. The Ontario government was not expecting the strength and speed of this online movement and, ultimately, amended the most restrictive provisions in the proposed legislation.

To communicate effectively with citizens, governments must pay more systematic attention to what their constituents are saying. To be sure, actively listening to, communicating with and engaging with citizens in social media channels, where appropriate, should not be confused with Orwellian fears of government spying on citizens. Government outreach through social media channels should be conducted in a forthright manner with the expressed objective of soliciting citizen feedback on programs and services. This would help governments avoid the kind of backlash that caught Ontario completely off-guard when it proposed stricter regulations on teenage drivers (see page 27).

After the reaction to the proposed legislation in Ontario, Premier Dalton McGuinty told *The Toronto Star*, “If you’ve got that many young people who are really interested in this, they’re not going to come to committee hearings... I think we need to find a way to get on Facebook. I think we need to find a way to engage them in a dialogue in a social network where they are.”¹¹

3 Crowdsourcing ideas

While many governments take advantage of already well-established social networking tools, some have created their own forums for citizen collaboration. When officials in the City of Santa Cruz, California decided that they couldn't wait the 12 to 24 months it would take to hold community forums and elections to help solve their budget crises, they developed a community feedback portal (<http://budget.santacruzcityca.gov/>) where residents could share ideas about how to solve the problem.

Along with providing information about the budget and updates on budget-related activities, the site posts suggestions from residents, plus any comments the city receives from other site users, and gives users a chance to vote on those suggestions. Ideas that receive the most votes appear on the homepage. Users also can view ideas that the city has implemented or started to implement and read comments from city officials about those initiatives.

In New South Wales, Australia, Paul McLeay, a member of the state parliament, has established a social networking site to crowdsource ideas about how to invest the A\$300,000 available to his electoral district under a program called the NSW Community Building Partnership. Individual community groups, such as scout troops, sports clubs, school groups and volunteer fire brigades have posted proposals for using portions of the fund, some with videos to support their applications. Local residents can register with the site, review the applications and vote for the proposals they like best. McLeay says he will use these votes to help him make recommendations on which proposed projects to fund.¹³

Individuals working within government organizations may also take advantage of social media tools to help with their jobs. For example, Chad Moutray, chief economist and director of economic research at the U.S. Small Business Administration's Office of Advocacy, uses the "Answers" feature on the professional networking site LinkedIn to crowdsource information on issues he is researching. To prepare for a forum on surviving the recession, he posed this question to members of LinkedIn: "What measures should small businesses take to weather this economic downturn?" He received 1,039 answers. On another occasion, he asked, "What can policymakers do to promote more small business innovation and keep the U.S. competitive with other nations?"

4 Identify service delivery problems

Less concentrated data on citizens' views and experiences with government services also can be accessed on the Web. A simple Google search can yield first-hand accounts of citizen experiences with everything from counter services to child welfare. A recent search of the term "liquor license delays," for example, yielded a *New York Times* article on how such delays were hurting restaurateurs in New York and numerous blog postings that cited or reproduced that article, some with comments. A search for "DMV long lines" brought up a wide variety of news stories about how this problem at motor vehicle departments throughout the U.S. affects and frustrates residents.

Citizen groups also have emerged as aggregators and enablers of citizen input on government services. The tools they provide make it easy for citizens to express their opinions to government officials, report local problems and, in some cases, monitor the government's response.

In the U.K., at FixMyStreet, users report on broken pavement, excessive litter and similar problems. FixMyStreetCanada (www.fixmystreet.ca), developed by VisibleGovernment.ca, offers a similar service for Canadians.

In San Francisco, a nonprofit advocacy group, the Neighborhood Parks Council, developed ParkScan (www.parkscan.org) in 2003. The site allows community members to report maintenance issues they observe in city parks. Thanks to a partnership with the city established in 2009, ParkScan automatically sends these reports to the city's 311 system. A tracking number is assigned to each report and the responsible department is notified by 311. Data about problems reported to the city stays on the site, even after city workers close the jobs out, so users can monitor activity regarding topics that interest them. For example, a user could search for complaints about graffiti, sort them by park to find complaints for a specific park and view the status of the response to each complaint.

5 Communicate faster and better

Twitter is proving especially helpful for sharing information with the public as a government agency responds to an emergency. The Los Angeles Fire Department (LAFD) uses the service to update the public on structural fires and other emergencies. In 2007, as a wildfire threatened the city's Griffith Park, residents nearby sent tweets to the LAFD, advising firefighters about wind direction and hot spots.¹⁴

Mississippi has established a separate Twitter page for each highway in the state that has been designated as a hurricane evacuation route. The state Department of Transportation's *Hurricane Evacuation Guide* tells residents to check those Twitter feeds for instructions if they need to evacuate in an emergency.¹⁵

Canwest News Service, 29 November 2008: In your Face(book), teen drivers tell Ontario Premier in online petition

The Ontario government did not expect young drivers to be pleased with recently unveiled plans to institute tough new regulations for the road. But neither did it foresee the cyber backlash that would ensue as a Facebook group decrying the proposed reforms to the graduated-licensing system swelled to more than 128,000 members as of yesterday. "I don't think anybody anticipated this," said an official with the transportation ministry, speaking on conditions of anonymity. "We were expecting backlash, yes, but not to this magnitude; and I think it just speaks to the new ways communication tools work."

The online outcry that followed the new driving regulations, which include plans to limit drivers under 19 from ferrying more than one teen passenger, prompted Premier Dalton McGuinty to suggest he may rethink some of the new rules.¹¹

From legacy to leading

Social networks can provide governments with citizen data on a limitless range of programs and services. Citizens want to be heard and are willing to spend the time to present their views through many different social networking channels. In some cases their input is well organized and targeted. In others, it is found in the online chatter that surrounds many government programs. For government organizations to leverage the rich data that

resides online, they must do more than react to Web-based movements. They need to mimic the social marketers that have come before them, proactively searching for structured and unstructured data on how citizens are interacting with public services. Moving from legacy to leading practices will require trial and error, along with a willingness to reach out to online communities.

Table 3. More responsive government

	Legacy	Learning	Leading
Strategy	<ul style="list-style-type: none"> No coherent strategy Government awareness of online discussions is reactionary, primarily arising in response to major protests 	<ul style="list-style-type: none"> Attempt to “get on the Web” but lack a clear vision and strategy Unsure of how to leverage online resources to encourage participation 	<ul style="list-style-type: none"> Government organizations proactively leverage Facebook, Twitter, MySpace and other websites to solicit feedback Targeted attempts to get on the Web where it is most likely to be required and successful
Culture	<ul style="list-style-type: none"> The culture is outdated, failing to understand the power of online organization and discussion Opportunities to provide input or discuss policies and services are provided only through traditional routes (such as committee hearings) 	<ul style="list-style-type: none"> Most of the government’s efforts involve more actively providing information online (through Facebook, for example) rather than using community websites to generate discussion and solicit feedback 	<ul style="list-style-type: none"> Online participation and collaboration in government is viewed as essential Proactively engaging with the public substantially increases the government’s ability to improve customer service
Access	<ul style="list-style-type: none"> Limited data are provided to the public with little or no consultation 	<ul style="list-style-type: none"> Some mechanisms (such as online suggestion boxes) for listening to citizen demands for new data 	<ul style="list-style-type: none"> The government actively solicits feedback from online groups, using blogs, Facebook, Twitter and other Web 2.0 community sites to determine what data the public desires

Lessons in execution

The Web gives citizens a powerful tool for expressing their views on government policies and services. Government organizations have responded to the more focused and organized online campaigns. But leading governments are now looking for ways to move beyond reactive practices. As they learn to be more proactive in tapping into data from social networks, public leaders should explore the following:

- **Systematically monitor what citizens are saying about your programs.** This requires designing roles and investing in tools to monitor online feedback on programs and services. While many governments are increasing their presence on the Web and soliciting user feedback through it, the leaders are reaching out to harvest the data on public services that exist in social networks. In the process, they are turning up the volume on social media channels.
- **Participate in social networks.** Through Facebook, Twitter and other social media sites, governments are reaching out to the online community to participate in discussions and encourage public input.
- **Refine your social media marketing strategy.** Many agencies are only beginning to understand what drives users to their sites. By adopting leading practices in social media marketing, governments can more effectively attract target audiences. In the process, they acquire valuable data on how programs are working and input to shape future changes.

Faster government through social media

The U.S. Food and Drug Administration (FDA) demonstrates how to constructively engage with citizens using social media to conduct mission-related outreach. When salmonella contamination forced the recall of many products containing peanuts in early 2009, the FDA used a wide variety of online collaborative tools to get the word out on what products to avoid. The strategy was to reach citizens where they spend their time. "People are not going to necessarily come to the FDA website," said Dan Luxenberg, Web 2.0/social media lead in the FDA's Office of Web communications. "They're going to talk among themselves and they're going to other websites. We want to get our content out on as many boxes out there as possible."¹⁶

One striking aspect of the FDA's strategy was the way the agency enlisted citizens to share information among themselves, getting the word out to far more people than the FDA could have reached on its own. For example, the FDA created a list of snack products to avoid and made that available as an Extended Markup Language (XML) file. "And we allowed people to take that data and do with it what they will," Luxenberg said. The FDA also created a widget that anyone could post on a blog, Facebook page or other site. The tool allowed people to look up products on the FDA's database. Anyone preparing to bite into a peanut butter cookie could look that product up on the spot and find out if it was safe to eat. This widget eventually appeared on 20,000 sites.

In addition, the FDA used Facebook, MySpace and other popular social networking venues to disseminate information. The Twitter feed it created for the recall gained 12,000 followers, Luxenberg said.

Throughout its efforts, the FDA made a point of tapping the wisdom of crowds. It made note of users' comments in response to its communications and it considered those comments as it designed later phases of the information campaign. For example, when the FDA created a YouTube video listing the dos and don'ts of the peanut recall, the script responded to questions the agency had received from the public via social networking sites.¹⁷

Government leaders recognize that in addition to leveraging community resources to analyze public data, they also must get better at analyzing vast stores of public data – in addition to online sources. Much of the power of public data are trapped deep inside the transactional systems of government – those systems used for processing driver’s licenses, administering prescription drug programs, collecting taxes and controlling borders, for example. Since governments traditionally have not shared data, even within their own walls, they may have missed many of the insights that can come from understanding the data relationships among social, demographic, economic, health, education and criminal justice issues.

To increase the utility of government online data, governments themselves must develop the analytic capabilities to share and manipulate the data they collect, along with the increasing volume of unstructured data available online. Even the most open government cannot make all of its data available to the public – commercial confidentiality and privacy concerns place limits on what can be released. Sometimes, the insights that governments need to obtain from transactional data are different from the kinds of knowledge that citizen groups seek. Also, vast quantities of data are currently locked up within government units, making it difficult for managers to analyze the interplay among programs. Some agencies – security, defense, justice and revenue – are well ahead of their colleagues in learning to get the greatest possible value from the data they possess. But if unlocking public data is to have a truly transformative effect on how government works, data analytics will need to become a core competency of most agencies.¹⁸

In the private sector, recent books, such as *Moneyball*, *Competing on Analytics*, *Nudge*, *Super Crunchers* and *Predictably Irrational* have elevated the subjects of analytics and the limits of intuition. Organizations are learning that practices based on data and evidence-based decisions consistently prove more effective than practices based on conventional wisdom or “gut instinct.” As organizations continue to collect greater and greater

amounts of data and software tools become more powerful, the ability to mine and model data becomes ever more important for generating useful and actionable insights and competing in an increasingly analytical world.

Leading firms have overcome the tendency to make crucial decisions with incomplete information. Instead, they are using analytics tools to mine the exabytes of data they collect, teasing out trends to help them to predict customer behavior. With this capability, managers can quickly call up answers to questions, such as, “Which customers are most likely to defect to a competitor?” and plan accordingly.

Governments also manage vast storehouses of data. Just like corporations, they, too, must learn to mine their data stores, in addition to online data, as a means to transform decision making and action.

From insurance companies and baseball teams to doctors and administrators working in public hospitals, organizations are learning that data and the evidence-based decisions the data enable, lead to better outcomes.

It was through a strategy focused on leveraging data to make good decisions that the Oakland Athletics, with the second lowest payroll in Major League Baseball, managed to win the second largest number of games between 2000 and 2006. But it was also through a reliance on data that the Veterans Health Administration was able to outperform all other healthcare providers in the U.S., consistently achieving the highest rating of customer satisfaction. In Baltimore, the use of data to measure performance, develop solutions to local problems and hold city officials accountable is credited with saving the city \$350 million over the last 10 years.

Leading governments are investing in building a core competency in data analytics. This involves acquiring the software tools to manipulate vast stores of public data – often provided by more than one agency – and investing in the people and processes to drive analysis and take action.

Three ways data analytics can foster smarter government

1 Make sense of disparate information

The Illinois Department of Transportation (IDOT) has built a business intelligence platform that give employees throughout the organization direct access to data that before had been trapped in many separate information silos. Now, dashboards allow employees to draw data from multiple IT systems in order to perform analyses and monitor performance. For example, a fatalities dashboard allows IDOT to analyze the various causes connected to fatal accidents, such as speed, alcohol, weather and improper use of lanes. One analysis revealed that a significant number of crashes were caused by factors that IDOT wasn't tracking, spurring the department and the state police to look into other causes they needed to track.¹⁹

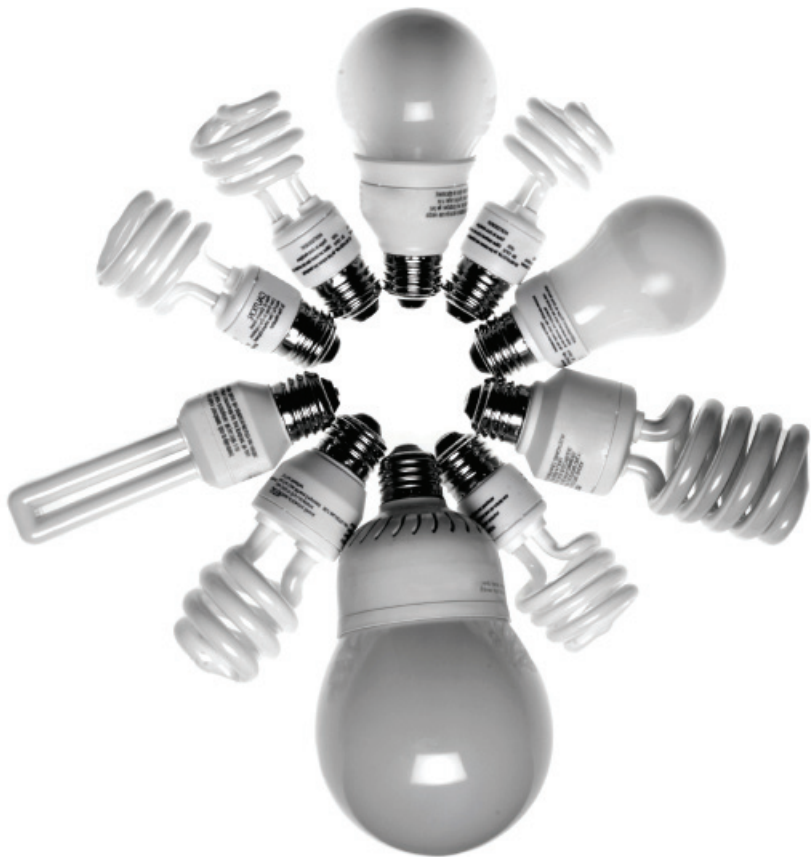
2 Increase effectiveness

In England and Wales, police departments are using mapping technologies to understand and track crime trends in neighborhoods. Studies have shown that police perception of where crime occurs often does not match reality. By combining geographic data, census data, land use information, crime incident reports, crime initiatives and other sources of information, police officers create maps that provide much better intelligence than their own experience could provide. Police can use the maps to gain information on a single offense, multiple offenses of a similar type or a series of offenses that have become a major local crime problem. Law enforcement organizations across England and Wales now use crime maps as part of their daily activities. Every police department also has made these maps available to the public on their websites.

Baltimore uses a data tracking and management tool called CitiStat to manage all city programs and services. Much of the data that CitiStat uses comes from the centralized 311 non-emergency number used in Baltimore. Each caller's complaint is entered into a database and referred to the relevant city department. The data empowers the mayor to monitor the responsiveness of city departments, press for improvements and understand and prioritize issues of concern to Baltimore residents. According to the mayor's office, CitiStat has resulted in savings of over \$350 million in Baltimore. At least 11 American cities and two state governments have implemented CitiStat or a similar variation of the program.

3 Combat fraud

Revenu Québec developed the Wealth Indicators Project to combat tax evasion and discover amounts payable that were not being identified using traditional audit methods. Based on a cross-section of social and financial information provided by government departments, organizations and private businesses, the new system allows Revenu Québec to analyze more than 200 billion pieces of information. Based on the project, Revenu Québec recovered \$189 million in additional revenue between 2003 and 2008, with a net benefit of \$157 million.²⁰



From legacy to leading

Data analytics is a rapidly maturing discipline that, while commonplace in areas like public safety and revenue management, is only beginning to be explored in other policy domains. Leading government agencies are recognizing that evidence-based, policy-making and

service design requires an ability to mine public data to gain insight into performance. Moving from legacy to leading will require governments to invest in building the capabilities needed to unlock the valuable insights within their data stores.

Table 4. Smarter government

	Legacy	Learning	Leading
Strategy	<ul style="list-style-type: none"> Data are collected on key performance indicators and are reported infrequently (such as in an annual report or at committee meetings) to show program outputs Data are not strategically leveraged to improve performance 	<ul style="list-style-type: none"> Governments recognize the need to manage their data more effectively but do so primarily to make processing responsibilities more efficient (that is, putting health records online to improve efficiency for doctors, pharmacists, and other practitioners who require the records) Data are not strategically leveraged to improve performance 	<ul style="list-style-type: none"> A large data warehouse containing multiple data sets is created Data are systematically analyzed to inform policy
Culture	<ul style="list-style-type: none"> Decisions are made without systematic use of data The “gut feeling” of program managers is often relied upon for decisions 	<ul style="list-style-type: none"> It is recognized that data can be processed more effectively to improve efficiency, but the systematic use of data to drive decisions is missing Policies remain based on conventional wisdom, at times absent of any concrete evidence 	<ul style="list-style-type: none"> Decisions are made and evaluated based on evidence – conventional wisdom is no longer allowed to decide important policy questions
Access	<ul style="list-style-type: none"> Data are made available to select analysts – however, the data are updated infrequently (for example, only annually), which makes it very difficult to assess projects and make decisions in real-time No data warehouse has been created 	<ul style="list-style-type: none"> Governments provide access to required stakeholders under exceptional circumstances Business intelligence tools are being piloted 	<ul style="list-style-type: none"> Data are frequently updated (often in real-time) allowing for effective decision making Data warehouses combine data from multiple stores to assess cross-program issues Data are shared across boundaries under appropriate controls

Lessons in execution

Although aspects of data analytics in government have existed for many years, most organizations have not viewed this as a core competency or central to their role. However, as citizens begin to demand greater access to public data and as evidenced-based policy making takes hold, governments are starting to see the value of developing these capabilities. Much can be learned from revenue agencies, health authorities, crime units and the private sector.

- **Focus analytics on your core mission.** The vastness of the public data that exist can lead organizations to lose focus on the purpose of data analytics. Efforts to develop analytical capabilities need to be driven by your agency's core mission. Where the data are providing insights that challenge accepted norms, it is important to be ready to adjust strategies and tactics.
- **Approach data analytics as a new core competency, not a new tool set.** Too often, organizations believe that the powerful tools that exist to analyze vast data stores are the answer. This is far from the case. Organizational competencies, data ownership policies, cultural norms and management processes all need to be rethought if the power of the analytics is to be exploited.
- **Enlist key partners inside and outside your agency.** The pioneers in data analytics quickly learned that the interrelationships they needed to understand require data outside their own domain. Even within agencies, the culture of localized data ownership needs to be overcome to extract maximum data value.
- **Leverage the online community.** The online community can be encouraged to mashup data in innovative ways. Your focus should be on program performance and manipulating data sets that contain personal and commercially confidential information. However, citizen-led data analytics should be brought into policy analysis, where feasible, given the resources and imagination that exist outside government.



Challenges moving forward

On the surface, the idea of making data available to the public seems straightforward. After all, most of the data derive from citizen interactions with government. Exposing them is merely reporting back to citizens the facts on their interactions, at the lowest level of measurement. Why wouldn't governments be expected to provide transaction-level data to citizens, where personal information is protected? And why wouldn't governments and citizens want to mine data within and across programs to find patterns that could improve outcomes?

Sharing public data isn't quite that simple, at least, not yet.

The IT systems used in government evolved at a time when public agencies held most of the information they collected close to the vest. To pave the way for meaningful change, governments need to rethink IT architectures, update long-standing laws and policies and turn old concepts of data ownership inside out. Public access needs to be a core principle that is designed into technology solutions.

But the challenge is not only one of technology. In fact, the tools for extracting, analyzing and presenting vast amounts of data have never been more accessible. Even though governments are always challenged to realign their efforts with new priorities, the obstacles to sharing public data are not a question of resource availability. The online community represents a vast, largely untapped resource pool for governments to draw upon. And internally, much of the time that governments spend controlling and protecting data that will inevitably be released could be devoted to getting routine data into the open.

The greatest challenges will be in changing the philosophy that underlies the leadership and culture of government agencies. The inevitable shift toward more open data access has significant implications for the way government leaders view their relationships with citizens and with each other. The future of effective government lies in its ability to connect with citizens at the lowest level of abstraction (that is, the data level). Complete and timely release of performance data is becoming an objective measure against which government transparency is being judged.

To transform themselves by leveraging public data, governments will need to overcome a number of significant challenges. As daunting as these challenges may be, most leaders agree that they must be overcome.

Rethinking data ownership across the enterprise

For most public agencies trying to open themselves to stakeholder participation, the biggest challenge is the need to rethink data ownership. Traditionally, data have been owned by program managers within units or

subunits of government who have been tasked with controlling and limiting access. This narrow definition of data ownership is now outdated. In fact, data should be viewed as enterprise assets, to be leveraged by the agency as a whole and by its stakeholders. This, of course, means that governments may need to rewrite current practices, policies and even legislation to enable the power of data sharing and analytics.

The Government of British Columbia, for example, is creating a research data warehouse. Under the direction of the CIO, this warehouse will offer a consolidated database of information drawn from multiple government sectors. Taking this data out of the silos where it traditionally resides, makes it possible to combine data drawn from multiple sources. That, in turn, allows policymakers to study the interrelationships among a variety of factors that affect health, education, crime and other social conditions. In setting up this pilot project, the province has to address the conditions under which data can be securely shared across policy domains. In so doing, government officials are working to extract incremental enterprise value out of traditionally stove-piped data stores.

Viewing data as a public asset

Rethinking data ownership extends well beyond even the bigger boundaries of the “whole of government” enterprise. Increasingly, governments and citizens are starting to view public data as a public asset, to be shared broadly rather than limited to a select few.

The City of Toronto has established an open government advisory committee to help it determine what data citizens want and how best to provide it. The city is starting from the basic premise that it will disclose data on city plans, budgets, operations and activities to citizens. By assembling a team of outside citizen advisors with experience and interests in data disclosure, the city is working to strike the right balance between adhering to the broad principle of data disclosure and pragmatically providing data that citizens can use.

But as Toronto CIO David Wallace says, “There is a culture change required. Cities can no longer think that all this data is theirs to own and protect and possibly use to make money. Citizens won’t accept this and it’s not in the best interest of the city to ignore the valuable feedback that citizen groups can provide.”²¹

So, one way to overcome internal resistance to making data a public asset is to get citizens to help set priorities for broad disclosure and determine the most practical means for providing data.

Exposing, leveraging and even expanding public data, by redrawing the boundaries that are used to define data ownership, are having dramatic effects. In Alabama, for example, the state Department of Homeland Security launched the Virtual Alabama project in 2005 as a way to give responders at the state and local level a common operating picture in an emergency. Using Google Earth Enterprise as a three-dimensional visualization platform, the system provides a central access point for data and imagery drawn from all of the state’s 67 counties, including buildings, floor plans, roadways, sewer and power lines, fire hydrants, locations of cached medical supplies, approved landing sites for medical helicopters, and numerous other categories of information.²² As of July 2009, more than 5,000 users representing more than 1,450 agencies in the state were accessing data from Virtual Alabama. Along with emergency response, governments in Alabama are using the system for functions related to law enforcement, economic development and planning, natural resource management, education, agriculture and other functions.²³

Making data personal

A common argument against sharing of public data is a concern about disclosure of personal information. Clearly, privacy issues pose a significant and serious challenge. But the impetus to shift control of data from service provider to citizen is strongest in the area that citizens consider very private indeed – their personal health. Here, citizens are demanding access to personalized health information and, in many jurisdictions, they are receiving it.

Traditionally, patients and their families have depended on physicians to store and share their personal health data. But there is a growing demand to change this situation. In a survey of health care consumers that Deloitte conducted in 2009, more than 65 percent of respondents said they would like to be able to access the personal health records of family members whose care they are helping to manage. More than 60 percent said they were interested in having their doctor’s office, hospital and government provide a personal health record or online medical record.²⁴

Today, governments around the world are investing heavily in systems that allow healthcare professionals to share data on the patients they treat and give patients electronic access to their own healthcare data. Giving access to this kind of information allows consumers to participate more fully and more knowledgeably in healthcare decisions.

In 2003, Denmark launched the National Health Portal that gives citizens and healthcare professionals a one-stop shop for health-related information and services. The portal sets a number of self-service benchmarks, allowing patients to access their medical histories, view prescription information and set appointment times with their doctors. Denmark’s Electronic Patient Record system consolidates a number of formerly disconnected IT systems into a single information point for medical professionals. It provides access to notes, patient medications, treatment plans and examination results about individual patients. It also allows staff to plan and book examinations electronically and provides support for decision making.

Citizens soon will start to expect similar access to personal information in other areas, such as support services for children with special needs. As governments wrestle with how to provide secure, personalized data to citizens in a variety of areas, lessons learned in the healthcare sector will help them move forward.

Developing public servants into social media knowledge workers

As the social media craze has spread, many governments have struggled to define the role of public servants in this environment. Forward-looking government leaders have embraced the movement and encouraged managers to get themselves and their programs involved by establishing a presence on sites, such as Facebook and Twitter, using YouTube to distribute videos and otherwise taking advantage of the opportunities social media affords to connect and engage with citizens. Other government executives have focused on early missteps, in which government workers breached security or privacy regulations while posting on public forums. In reaction, they have forbidden employees to sign onto social networking sites while on the job or to participate in online forums.

To unlock government, public leaders must start to view public servants as social media knowledge workers. They must not only allow managers and staff to use social networks for sharing public data and harvesting insights into how programs are performing – they must require it. At the same time, they must deal with legitimate concerns about what kind of communication is appropriate on a public network.

The U.S. Department of Defense (DoD) provides a good illustration of the dilemma that government organizations face with regard to social media. DoD uses social media extensively. It maintains a presence on Facebook, Twitter, YouTube and Flickr, using those channels and its own websites to connect with potential recruits and carry on conversations with military members and the general public. Navy Admiral Mike Mullen, chairman of the Joint Chiefs of Staff, uses a Twitter account, as does Air Force General Craig McKinley, chief of the National Guard Bureau. But DoD's military branches have struggled with the difficult question of how much freedom to give military members to participate in social media and what

risks this permission may cause. In August 2009, the U.S. Marine Corps officially prohibited Marines from using social media sites on computers owned by the service. The following month, DoD announced that it was developing a department-wide social media policy that would balance the pros and cons of using these communications channels.

The Government of Ontario has been wrestling with a different set of challenges that arise from the use of social media. The Ministry of Government Services' Digital Ontario site (www.digitalontario.mgs.gov.on.ca) provides a forum where anyone interested in efforts to provide broadband data services throughout the province can access and share information and discuss policy issues. The portal makes all research and program information related to broadband in Ontario available to the public, and it uses polls, discussion forums, open-ended questions and other techniques to encourage discussion. This site has been very successful in engaging stakeholders, but it has not been obvious from the start how best to manage and take advantage of this kind of tool.

"A key challenge for governments is to learn how to first set a platform for public discussion; then how to guide and monitor it; and, finally, how to best incorporate public input into both policy and program delivery," said David Nicholl, Ontario's corporate chief information officer.

"Digital Ontario has allowed us a valuable learning process (i.e., when and how to use these tools). It is also important to emphasize that these emerging technologies are more than just a set of tools. They also represent a philosophical shift in how we communicate and get the work done."²⁵

The movement to include social media participation in the job description of some government employees is triggering important changes in government leadership. It is helping to nurture a new philosophy of data ownership and promote openness across agencies.

Lessons in execution

Stakeholders who are well-versed in social media expect data to be open, accessible and freely modifiable. They are highly sensitive to privacy concerns, but they recognize the need to balance protective processes with collaborative ones. They also recognize that governments can only do so much on their own with the vast repositories of information they currently store and protect. For the most part, data accumulated over decades in silos that government controls and owns just sit there. Governments simply do not have the money or staff to extract value from most of these data.

By shifting the focus outward, making data available to the public, governments can close the gap between government and citizens. Citizens who are comfortable with online collaborative tools aren't only demanding greater access to information, they're volunteering to help. Government-stakeholder partnerships of this kind can transform how services are delivered and how citizens influence the longer-term evolution of government.

Governments won't move away from traditional views of data management and ownership overnight. Transitions of this scale and scope must not be viewed as point-in-time changes. Rather, they represent strategic evolutions. Understanding how the maturity model works is key to deriving optimal collaborative value from this transition.

- **Make raw public data easy to access and reuse.** Nothing can change until the very notion of data ownership shifts away from the existing hierarchical and internal model to one that is collaborative and distributed. Of course, this is often the most challenging step, as it requires fundamental change to the culture of government. Still, as governments look for ways to meet growing stakeholder expectations in an increasingly resource-constrained landscape, they will have little choice but to loosen their grips on information formerly viewed as strictly internal and proprietary.
- **Let the users design.** Governments cannot do it all and they will fall even further behind if they cling to the notion that they alone must drive new program initiatives. By bypassing traditional requirements-gathering processes and placing more of the initial setup work into the hands of citizens, governments leverage the much broader capabilities of an external audience and position themselves to more effectively integrate their diverse and broad-based needs into program deliverables.

- **Tune into social networks to gain insight into the effectiveness of policies and programs.** If the rapid evolution of social media tools is changing the way citizens communicate, it will also radically change how governments assess the state of their external environment. Traditional scanning methods, such as surveys, are expensive and unresponsive compared with social media tools, which can deliver real-time insight into trends and expectations far more cost effectively. In many cases, governments can use ear-to-the-ground scanning as an initial step before taking on more expansive data-sharing initiatives.
- **Make data analytics a core competency.** Evidence-based decision making is a foundational element of effective government and evidence is generally based in data. In their efforts to extract the greatest value from public data, leading governments are building their capabilities in data analytics and using their findings to drive action. Citizens are also feeding governments fact-based information that drives better performance. As the momentum builds in the public and private sectors alike, governments will increasingly be required to justify their decisions with data. Moreover, they will be able to be more responsive when data show that adjustments to programs and services are warranted.

An important note before embarking on your first – or next – open government initiative

As with any major initiative, there will undoubtedly be unintended consequences that arise as a result of the unlocking of government. Government managers have legitimate concerns about protecting citizen confidentiality, managing security risks and opening up their work to criticism by a public that is sometimes more – and sometimes less – informed about the issues.

While unintended consequences are a fact of life, they shouldn't thwart open government efforts. Rather, government managers must take unintended consequences seriously and actively seek to identify, mitigate and manage the potential risks associated with the unlocking of government data.

Getting a diverse group (which includes critics) involved in planning and war-gaming efforts; probing for weaknesses in an initiative before it's launched; and experimenting with small pilot projects to understand what works and what doesn't can help you identify potential issues. To increase the likelihood of your initiative's success, it is important to get - and stay - ahead of the risks.

Closing thoughts

We are only starting to understand the ways in which governments can leverage data to improve performance. But we know that the potential for using mashups, crowdsourcing, analytics and other techniques to transform data into meaningful knowledge – for average citizens, government managers, legislators, business owners and other stakeholders – is tremendous.

For the most part, the data accumulated over decades in those government-owned and controlled silos are static. Governments can only do so much with their vast repositories of information. Most have neither the mandate nor the means to extract value that can be mined from multiple public and private data stores. But unlocking these stores will create the potential to improve public outcomes in nearly limitless ways.

Government leaders have before them an opportunity to combine the resourcefulness of online citizens and entrepreneurs with the power of factual data to more effectively achieve their mission. In an information-driven age, the ability of governments to seize this opportunity may ultimately determine whether a government fails or succeeds.

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