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# Policy in the data age: Data enablement for the common good

Digital McKinsey August 2016

Like companies in the private sector, governments from national to local can smooth the process of digital transformation — and improve services to their “customers,” the public — by adhering to certain core principles. Here’s a road map.

**By virtue of** their sheer size, visibility, and economic clout, national, state or provincial, and local governments are central to any societal transformation effort, in particular a digital transformation. Governments at all levels, which account for 30 to 50 percent of most countries’ GDP, exert profound influence not only by executing their own digital transformations but also by catalyzing digital transformations in other societal sectors (Exhibit 1).

The tremendous impact that digital services have had on governments and society has been the subject of extensive research that has documented the rapid, extensive adoption of public-sector digital services around the globe. We believe that the coming data revolution will be even more deeply transformational and that data enablement will produce a radical shift in the public sector’s quality of service, empowering governments to deliver better constituent service, better policy outcomes, and more-productive operations.

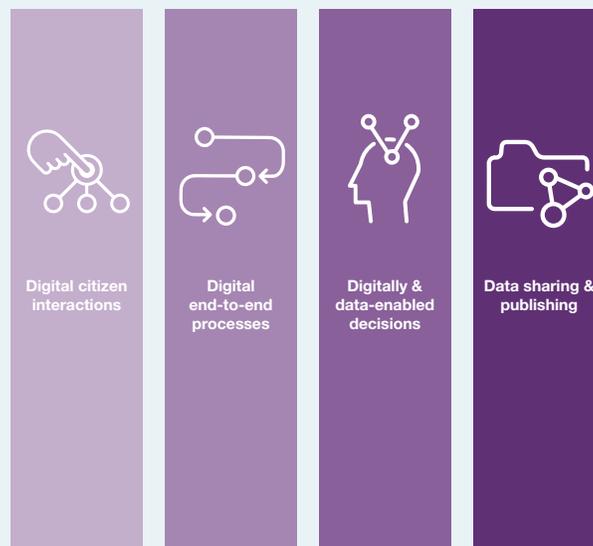
## **The data revolution enables governments to radically improve quality of service**

Government data initiatives are fueling a movement toward evidence-based policy making. Data enablement gives governments the tool they need to be more efficient, effective, and transparent while enabling a significant change in public-policy performance management across the entire spectrum of government activities. As Exhibit 2 shows, data applications can transform operations and service delivery in everything from tax compliance and collections to economic development to healthcare to education — and much more.

## Exhibit 1

### Governments have a dual role in a country's digital transformation.

#### Government digitization: Four pillars to accelerate



#### Government as a digital catalyst of social & economic transition



McKinsey&Company | Source: McKinsey analysis

To raise quality of service, optimization applications are necessary but not sufficient in themselves. Governments also need to deploy a comprehensive and open performance-management system: data enablement provides a solid fact base for policy making while allowing transparency and public accountability. With this perspective in mind, governments need to launch data initiatives focused on:

- better understanding public attitudes toward specific policies and identifying needed changes
- developing and using undisputed KPIs that reveal the drivers of policy performance and allow the assignment of targets to policies during the design phase

## Exhibit 2

Great digital governments combine the power of digital with advanced analytics, big data, and IoT to deliver smart and integrated services.

Use-case areas	Examples
 <b>Smart tax</b>	<ul style="list-style-type: none"> <li>• Improve tax compliance and collections</li> <li>• Reduce financial criminality (reduce fraud and money laundering, detect competition distortions)</li> </ul>
 <b>Smart welfare &amp; employment</b>	<ul style="list-style-type: none"> <li>• Improve targeting of benefits</li> <li>• Improve skills-based job matching, training-programs definition, identification of future hiring needs</li> <li>• Reduce Social Security fraud, detect irregular-attribution-of-welfare scheme</li> </ul>
 <b>Smart safety &amp; security</b>	<ul style="list-style-type: none"> <li>• Crime-response and prevention: police force allocation optimization, individual criminal-behaviors prevention, detection of organized crime, corrections optimization</li> <li>• Border control and illegal-immigration prevention</li> <li>• Improve safety: crowd management, fire prevention and reaction</li> </ul>
 <b>Smart economic development &amp; agriculture</b>	<ul style="list-style-type: none"> <li>• Prioritize economic sectors at national/local level</li> <li>• Trace food sources to verify quality, prevent disease</li> <li>• Review pesticide and other chemical-substances usage</li> </ul>
 <b>Smart transportation &amp; logistics</b>	<ul style="list-style-type: none"> <li>• Enable smart lighting, reduce energy and/or water-consumption overall levels and peaks</li> <li>• Optimize energy sourcing</li> </ul>
 <b>Smart education</b>	<ul style="list-style-type: none"> <li>• Fine-tune "education journeys" for students</li> <li>• Enable teacher performance review benchmarked against peers</li> </ul>
 <b>Digital patient &amp; eHealth</b>	<ul style="list-style-type: none"> <li>• Support better health: detection of epidemics, identification of medicine-usage irregularities, international medication-price barometer</li> </ul>
 <b>Smart budgeting &amp; policy making</b>	<ul style="list-style-type: none"> <li>• Improve reliability of budgeting estimates and enable complex, real-time scenarios</li> <li>• Improve policy-making process, ex-ante and ex-post evaluation of policies and administrations</li> </ul>
 <b>Smart government administration</b>	<ul style="list-style-type: none"> <li>• Help protect governmental and national assets and information</li> <li>• Analyze procurement performance</li> <li>• Enable better talent management for the civil service</li> </ul>

McKinsey&Company | Source: McKinsey analysis

- measuring what is happening in the field by enabling civil servants, citizens, and business operators to provide fact-based information and feedback
- evaluating policy performance, reconciling quantitative and qualitative data, and allowing the implementation of a continuous-improvement approach to policy making and execution
- opening data in raw, crunched, and reusable formats.

The continuing and thoroughgoing evolution taking place in public service is supported by a true data revolution, fueled by two powerful trends.

First, the already low cost of computing power continues to plummet, as does the cost of data transportation, storage, and analysis. At the same time, software providers have rolled out analytics innovations such as machine learning, artificial intelligence, automated research, and visualization tools. These developments have made it possible for nearly every business and government to derive insights from large datasets.

Second, data volumes have increased exponentially. Every two years the volume of digitally generated data doubles, thanks to new sources of data and the adoption of digital tools. And a new explosion of data is on the horizon, thanks to the wide-scale deployment of connected devices, which are expected to increase from 10 billion in 2013 to 50 billion by 2020.<sup>1</sup> Many of those devices will be associated with smart-city programs, such as sensors embedded in streets and other public areas. By 2020, smart-city usage in European cities<sup>2</sup> will generate 100 e-bytes of data per day—four times more than the global data generated daily from all usages in 2015.

Even without the data generated by connected devices, data enablement is already making a difference. A few examples suggest just how big that difference is.

**Smart defense.** One large national-defense organization increased equipment and weapons-systems readiness and availability through a data-enabled redesign of spare-parts sourcing and supply strategy. Data-analytics engines provided full transparency on the performance and fully loaded costs of spare parts, while also allowing analysts to simulate the impact of modifications in sourcing and supply strategies. The redesign produced optimized expenditures equal to 10 to 12 percent of the country's overall military operations and maintenance budget.

**Smart policing.** An advanced-analytics engine has enabled several major cities to improve the quality of police services and prevent threats from organized crime and terrorists. One of the tools was analysis of factors suggesting imminent gang activity, such as four or more Twitter posts from gang members within ten minutes.

More broadly, these cities integrated and analyzed open-source data (such as social media) and traditional police data to monitor public sentiment in order to provide early warning of actual or potential criminal activity and enable targeted and appropriate intervention; continuously track city-specific threats from organized crime and terrorist organizations; and monitor and preempt the potential radicalization of local populations.

**Smart corrections operations.** One penitentiary system is experimenting with data-based allocations of inmates and corrections officers, with the aim of reducing violence by 20 to 40

<sup>1</sup> For more, see "Is this the future of the Internet of Things?" World Economic Forum, [weforum.org](http://weforum.org).

<sup>2</sup> Cisco Global Cloud Index: Forecast and Methodology, 2014–2019 White Paper, [cisco.com](http://cisco.com).

percent. The system segments inmates according to their potential for violence, predicts toxic inmate combinations, and optimizes housing allocation and officer staffing by sorting inmates and staff according to language, experience, or certification.

**Smart transportation.** A major European city, responding to a spate of massive congestion episodes, has launched a multiyear program to eliminate road bottlenecks, reduce traffic jams, and optimize its mass-transportation network. Using analytics, city officials were able to design the program's strategy based on an accurate understanding of current and future patterns of urban transit. Their data tools enabled them to diagnose the root causes of bottlenecks, such as congestion caused by drivers looking for available parking spaces, and simulate the impact of different mitigation measures. The first measures implemented have produced an average speed increase of 8 percent and a reduction in parking occupancy from 100 percent to 65 percent.

**Smart infrastructure and utilities.** Barcelona's smart-city program has improved the city's environmental footprint and citizens' quality of life while creating 47,000 local jobs. Municipal authorities estimate that through smart-water and smart-lighting use cases, water consumption in municipal areas for parks irrigation and the like has been reduced by 25 percent, while electricity consumption for lighting has been reduced by 30 percent. These reductions have generated \$95 million in annual savings. In addition, Barcelona has implemented many other use cases, including automated waste management that enables sanitation workers to optimize their collection routes by prioritizing locations with full bins; improved care of the elderly population; and optimized transportation routing and scheduling. The city has undertaken this effort in collaboration with start-ups and multinational companies that jointly developed the technical infrastructure and applications to support the program.

#### **Four keys to capturing the full benefit of data**

The examples above represent just a few of the ways that data and analytics can improve government operations and the lives of citizens. But to capture the full benefit of data, states need to deliver on four key imperatives:

- Gain the confidence and buy-in of citizens and public leaders
- Conduct a skills-and-competencies revolution
- Fully redesign the way states operate
- Deploy enabling technologies that ensure interoperability and the ability to handle massive data flows

Gain the confidence and buy-in of citizens and public leaders through the articulation of a set of principles formalized in a data vision, a data strategy, and regulatory frameworks. Those principles are:

- *To work for the common good.* Data services are viewed as public services and data as a public asset beneficial to the society as a whole. Scotland has enshrined this principle in its “Data Vision for Scotland” (see sidebar, “Scotland’s data vision”).
- *To strive for inclusiveness.* States need to close the digital gap to eliminate the biases in data collection that result from lower usage of digital tools by some population segments. Estonia’s Digital Divide program and Look@World public-private partnership increased Internet usage from 32 percent of the population in 2001 to 77 percent as of 2011.
- *To ensure citizen integrity and data protection.* States should establish rules that govern what can and can’t be done with personal data. In particular, they should work to balance openness—across agencies, sectors or borders—and individual data privacy, confidentiality, and intellectual property rights.
- *To embrace data-based decision support.* This principle recognizes that while data greatly enhances decision support, it cannot supplant public leaders’ and citizens’ roles in decision making, moral judgment, and social change.
- *To achieve transparency and accountability.* Transparency allows for cross-benchmark execution, not in order to fix blame and enforce sanctions but to further the goal of continuous improvement. Both the French and UK governments have explicitly stated in law or policy that data should be open by default.

**Lead a skills-and-competencies revolution.** Governments need to identify and attract talent into data-specific jobs and positions, such as data scientists, data architects, UX designers, agile-development project managers, and analysts. The UK’s Government Digital Service has developed a comprehensive talent-management strategy for digital and data skills. Its recruitment hub helps all departments recruit digital and data talent and organize rotational programs.

Because data-specific skills are scarce, governments need to draw on their internal capabilities to advance this revolution. Civil servants are intimately familiar with their department’s or agency’s challenges and idiosyncrasies, and they are ideally positioned to drive improvements—provided they are equipped with the necessary digital and analytical skills. These can be developed through rotational, training, and coaching programs, with content targeted to different populations. The US is building the capabilities of its

## Scotland's data vision

- Scotland is a leader in using data to enhance the delivery and management of public services. As part of the country's digital transformation, the government has published its data vision for Scotland, which might serve as a model for the data visions of other governments. It appears below in slightly edited form.
- Data is used to support the delivery of outstanding public services.
- Citizens feel confident that personal data is being shared responsibly to create better and more responsive services that meet their individual needs.
- Citizens readily know how to access personal information held about them, allowing them to confirm its accuracy and to choose if they wish to create their own personal-data store.
- When personal data is used in research, the safeguards to protect privacy operate effectively and efficiently.
- Nonpersonal data held by the public sector is viewed as a societal good or resource that is readily available and accessible for reuse, in a format that supports that application.
- The government's capability is enhanced to address data challenges and opportunities so that data can inform public-service design and support economic growth.
- Collaboration between business, research, and the public sector will ensure that Scotland realizes its data vision and is internationally competitive.
- The public, private, and third sectors and civil society are continuously engaged in debate to ensure the continued effective use of data.

Source: Scotland's government website, gov.scot

employees through its DigitalGov University, which every year trains 10,000 federal civil servants from across the government in digital and data skills.

More generally, governments should train and incentivize civil servants to embed data discovery and analytics processes in their workplaces. That means that all civil servants' end-user computing platforms must feature data discovery and analytics tools.

[Fully redesign the way states operate.](#) States should install a dedicated data-governance model, led by a senior civil servant (possibly designated as chief data officer) positioned at a transversal level to supervise data centers of excellence (CoE). A CoE could, for example, develop technologies to mine data from social networks to produce insights into public sentiment or gain better knowledge of citizens and businesses through the application of geospatial analytics.

France has pioneered such an effort, appointing a governmental chief data officer in 2014. That officer heads Etalab, the government's CoE, and is armed with a mandate that gives the center access to data from across the government. Meanwhile, the Singapore government's InfoComm Development Authority manages data and runs analytics programs for the entire government.

If such efforts are to reach their full potential, governments must carry out a major cultural shift in order to break down silos and barriers. Such a transformed culture is characterized by a "test and learn" mind-set that believes "good enough is good to go."

The state of North Carolina is instigating cultural change through its iCenter, a lab for digital and data innovation where innovators offer their products and ideas to various agencies for testing. Testing enables the agencies to model the outcomes of these products and ideas and then invest in the most promising tools.

Cultures that facilitate governments' data transformations are also characterized by open, collaborative, and inclusive operating models for data generation and data usage. They facilitate the participation of public agencies, private-sector companies, start-ups, and society as a whole. One example of such a model is New York City's Open 311 platform, which enables New Yorkers to report potholes, missed garbage collections, unsafe construction sites, and other neighborhood issues. In the UK, meanwhile, the government's Open Data Institute, funded by the government and the Omidyar Institute, serves as an incubator for start-ups that create apps that draw on the government's open data. In 2015, the ODI was expanded to the entire EU, with funding from the EU Commission. Barcelona's @22 is using public funding to develop an ecosystem of private-sector players (including both start-ups and established companies) to develop smart-city use cases.

Deploy enabling technologies that ensure interoperability and the ability to handle massive data flows. The digital government of the future must act today to consolidate, make secure, and distribute interoperable data from public and private operators in reusable formats. Barcelona is a leader in this effort, having funded the development of Sentilo, a technology that enables communication among the more than 13,000 sensors, apps, and systems of the entire smart-city ecosystem. Estonia has undertaken a similar effort with its X-Road, which enables the sharing and reuse of data across both public and private sectors. In addition, this initiative enables advanced data-security services such as a data-integrity blockchain service, which will be available to all in 2016.

Governments also need to develop a reusable, undisputed, and universal authentication service for people and things so that service providers can know who and what is providing and using data. Estonia's eID scheme—featuring chip-bearing cards that can be used on- and offline—allows online authentication. The cards also serve as mass-transportation passes and parking permits.

To support this technology, national and local governments will need to develop data centers, cloud computing, and network capacity, especially for data generated by IoT devices. Sweden is a leader in building this capacity. Launched in 2009, its “Broadband strategy for Sweden” aims to deliver 100-mbps broadband speeds to 90 percent of the country's homes and businesses. As of 2015, 40 percent of businesses and residences had such coverage, earning Sweden first place in Europe (and third globally) on the Global Connectivity Index. New Zealand is also building its capacity, with its “cloud first” cloud-computing strategy.



The examples and recommendations in this article are inclusive but far from comprehensive. New and as yet unimagined opportunities to digitize government services are sure to emerge. We believe that in ten years, the data revolution will bring about radically different public policies for the benefit of public agencies and citizens alike. □

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Sincere thanks go to Dimitri Obolensky, specialist based in Paris, for his contribution to this article.