

# The Path to Digital Governance: An Agenda for Public Service Innovation and Excellence

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## About the Framing Innovation Dialogue Series

Framing Innovation: Westminster 2.0 in the Digital Age is an applied research and engagement project initiated by the Ottawa-based Institute on Governance. The initiative seeks to provide a conceptual, behavioural and institutional framework for innovation in the Canadian federal public service; one that positions our public institutions to take full advantage of the digital age and the opportunities it provides to government as we seek to evolve Westminster in the Canadian context.

The project aims to identify guiding principles that challenge the public service to move forward and build on the skills and competencies required for Canada to lead in digital era governance, while considering the realities and constraints that public servants must grapple with as they seek to innovate. The project's founding premise is that, as we redefine Westminster for the digital era, many of the traditional roles and activities of public servants may require a new orientation.

The guiding question the project seeks to answer is: given the opportunities afforded by the digital age, how do we encourage innovation and responsible risk-taking on the part of public institutions, to ensure that governments meet the challenges imposed by an informed public that increasingly expects engagement in the development of policies and programs, and tangible, visible results within ever tighter timelines?

To probe this central question, three dialogue sessions were held between November 2016 and March 2017 involving participants from a broad spectrum of institutions and sectors, including academic institutions, private sector entities and public institutions. In addition to panel discussions, attendees were invited to participate in break-out sessions organized around the key themes of the dialogue series, including:

- Enabling increased collaboration, openness and transparency in government;
- Modernizing the parliamentary-bureaucratic interface, including the interface between parliamentarians and public servants, as well as relationships with governing parties;
- Embedding new leadership and accountability approaches for a growing number of multilateral files that respond to government-wide priorities;
- Exploiting the potential of data analytics within realistic financial and institutional constraints;
- Leveraging new business models, such as those supplied by the sharing economy – to allow public institutions to serve the Canadian economy and Canadian society at large;
- Placing a renewed emphasis on results, delivery and outcomes – and the institutional adaptation required to align with these priorities;
- Fostering inclusiveness and diversity in our governance approaches, to ensure that outcomes match the Canadian reality.

This report provides highlights from these discussions and supplements them with additional analysis, case studies and recommendations for government.



## About the Institute on Governance

Founded in 1990, the Institute on Governance (IOG) is an independent, Canada-based, not-for-profit public interest institution headquartered in Ottawa with an office in Toronto.

Over the past 25 years, the IOG has advanced better understanding and practice of good governance in Canada, with federal, provincial, municipal and indigenous governments, not-for-profit organizations, and abroad.

Our work is marked by independent thought, innovation, collaboration, excellence, and a responsive and principled approach. We are uniquely positioned, as a truly independent, public purpose organization, to fill the need for knowledge, research and advice on good governance. We are a registered charitable organization.

### **Our Mission**

The IOG's mission is to advance better governance in the public interest, which the Institute accomplishes by exploring, developing and promoting the principles, standards and practices underlying good governance in the public sphere.

### **Our Vision**

The IOG's vision is to be the pre-eminent, independent Canadian source of knowledge, research and advice on governance and its continuous improvement.

### **Our Expertise**

Our leading expertise is rooted in our innovative leadership practices, ongoing and applied research and practice-based insights.

### **Our Work**

The IOG works with a wide range of clients and partners in Canada and abroad. These include governments, communities, universities, and private and public organizations. Our work puts us in contact with senior officials from all levels of government, as well as the voluntary and private sectors. This constant interaction affords us complementary perspectives – inside and outside views – of the challenges facing today's leaders. Our experience in and across sectors and settings makes our expertise flexible, sensitive, broadly based, and extremely useful to clients no matter their location, culture or traditions.

The IOG is governed by a Board of Directors. For more information visit [www.iog.ca](http://www.iog.ca).





## About the DEEP Centre

The Centre for Digital Entrepreneurship and Economic Performance (DEEP Centre) is an economic policy think-tank based in Waterloo, Ontario. Founded in 2012 as a non-partisan research firm, the DEEP Centre's work shapes how jurisdictions build fertile environments for launching, nurturing and scaling companies that will thrive in an increasingly connected world. The DEEP Centre provides objective research and advice on the changing drivers of success in the global economy and the critical interconnections between technology, entrepreneurship and long-run economic performance. Its research and advisory services have helped policymakers around the world identify and implement powerful new policies, programs and services to foster innovation, growth and employment in their jurisdictions.

- In 2016, the DEEP Centre published a groundbreaking report on Accelerating Canada's Clean Growth Economy which tracks adoption of clean technologies across the economy and identifies strategies for boosting growth and innovation in the clean tech sector.
- In 2015, the DEEP Centre conducted the first nationwide evaluation of Canada's network of business accelerators and incubators, which led to the formulation of new federal government initiatives for supporting the creation of high-impact firms in Canada.
- In 2014, the DEEP Centre worked with the Markle Foundation's Economic Future Initiative to identify strategies for increasing the productivity and global engagement of U.S.-based services firms using digital technologies.
- In 2013, the DEEP Centre produced an influential report on the evolution of Canada's Billion Dollar Firms, which includes a five-part analysis of the growth and performance of Canada's largest firms and their contributions to employment, innovation and export activity.

To find about more about the DEEP Centre's work, visit: <http://www.deepcentre.com>



## 1. Executive Summary

Governments around the world face a unique and challenging set of responsibilities. On one hand, they must navigate today's continuing geo-political and economic volatility by fulfilling promises to deliver economic growth and social progress. On the other hand, they must provide sound custodianship of taxpayer money and meet rising expectations for productivity and efficiency. Their capacity to do so, meanwhile, is being shaped by a confluence of technological, demographic, social and economic forces that holds both the promise and the inevitability of new models for delivering the functions of government. Indeed, as public sector leaders fashion strategies for public service modernization, they must be bold and unafraid to ask profound questions about the evolving roles and powers of the public sector:

- Can public agencies use technology to improve decision-making and channel greater ingenuity from citizens and the private sector into efforts to solve major challenges like youth unemployment and rising health care costs?
- Could regulatory bodies take advantage of the growing abundance of data to streamline approvals and better target inspections?
- Could service delivery move from a transactional approach to a “holistic”, citizen-centered perspective where citizens themselves play a more active and ongoing role in defining and even assembling the basket of services they need?

In responding to these questions, governments must consider how the co-evolution of technology and civic capabilities will reshape the social and economic landscape in the years ahead. The IOG Dialogue Series on Framing Innovation provided an opportunity for a rich set of discussions on these topics. Highlights from these discussions are summarized here and supplemented with additional analysis and case studies in the body of the report.

### Transforming public services for the digital age

As demonstrated during the IOG Dialogue Series, we live in a world where most citizens routinely use incredibly powerful digital services both at work and in their daily lives—from the social networking services that animate our social lives, to the music streaming services that learn and adapt to our musical tastes, to the sophisticated enterprise systems that underpin the operations of some of the world's largest corporations. Citizens are accustomed to digital applications and services that are elegant in their design and intuitive and fun to use. The most popular of these digital services support billions of users simultaneously and never experience any down time. Given this context, modernizing public service delivery and reaching new heights in innovation and efficiency is not an option, but an imperative.

Modern digital services have set a very high bar and citizen expectations will only get higher in the years ahead. Citizens will rightly expect a new level of service excellence. At a minimum, public



services should make it easy to transact, with less need for lengthy line-ups at public service counters. The online experience should be quick, intuitive and seamless, regardless of the user's choice of device or access point. Services should enable customization and always encourage feedback. In pursuit of excellence and innovation, service providers should routinely create opportunities for users to have a genuine role in shaping how services are designed and delivered.

Today's citizens increasingly expect to be active participants, not passive recipients. Modern services should facilitate collaboration and self-organization, recognizing that government needn't always be the primary solution provider. As citizens increasingly connect around shared interests and goals, the public service may find that the most direct and effective way to facilitate social and economic progress is to encourage citizens in similar situations to co-create their own solutions.



**Figure 1: Autonomous vehicles communicate to prevent accidents and alleviate congestion.**

As we look forward, the rapid acceleration of digital innovation is opening up new possibilities for services that scarcely seemed possible just a decade ago: clothing embedded with medical sensors that monitor key vital signs and whether or not you get enough sleep; a presence-sensing thermostat in your living room that turns the heat down when nobody is home; a refrigerator that monitors food consumption patterns and automatically orders your groceries; a worldwide fleet of autonomous vehicles that reduces the need for car ownership, revolutionizes personal transportation and alleviates urban congestion. Once the stuff of science fiction, such possibilities are here today.



## New models of regulation

Adapting industrial-era models of regulation for the digital age was another key topic of discussion during the IOG Dialogue Series. Here again we see the same powerful technologies that are enabling more efficient and client-centric services also giving rise to new models of regulation. Indeed, the proliferation of RFID, satellite imagery, cheap personal video recorders, powerful mobile computing devices and an array of Internet-connected sensors has created the possibility for citizens and other stakeholder groups to play an active role in designing and enforcing regulations.

The idea behind participatory regulation is that just about every area of regulation today—from air and water quality to food safety and financial services—could benefit from having a larger crowd of informed individuals helping to gather, classify and analyze shared pools of publicly-accessible data—data that can be used to educate the public, enhance science, inform public policy-making or even spur regulatory enforcement actions. In fact, one can imagine countless arenas where, if asked, experts and enthusiasts would help to provide data or to analyze existing data:

- Environmental authorities who gather data about air and water quality would benefit from more contributions from local sources and help with understanding the implications of data.
- When epidemiologists gather health data, third parties can help to analyze that data to identify potential threats to public health and correlate health data to location-based factors.
- When policing authorities gather crime statistics, third parties can help to map that data visually and make it useful to citizens in their own communities. They can spot and analyze trends that might not be readily intelligible from the raw data itself.

A scenario where all citizens will suddenly participate en masse is not likely, but nor is it necessary. As this report shows, even a small, well-organized group of highly-motivated citizens with access to information can use social networks like Facebook and Twitter to make a big impact. To tap this capability, however, regulatory agencies will need to open-up, rethink old processes and supply the tools and data that citizens need to contribute meaningfully.

## Mobilizing capacity for problem solving

The IOG Dialogue Series highlighted the fact that collaborative communities enabled by digital technologies have already demonstrated their potential to leverage considerable human knowledge and expertise and rapidly build their capacity to solve problems. As documented in this report, over one million citizen scientists are helping astronomers map the universe using an online crowdsourcing platform called Zoo Universe; thousands of pediatricians in one hundred and twenty countries are accelerating the dissemination of medical knowledge by aggregating leading pediatric care practices on a Web-based knowledge platform called OpenPediatrics; a global network of “forest watchers” are harnessing satellite monitoring and cloud computing to spot patterns of rapid deforestation and target illegal logging operations.

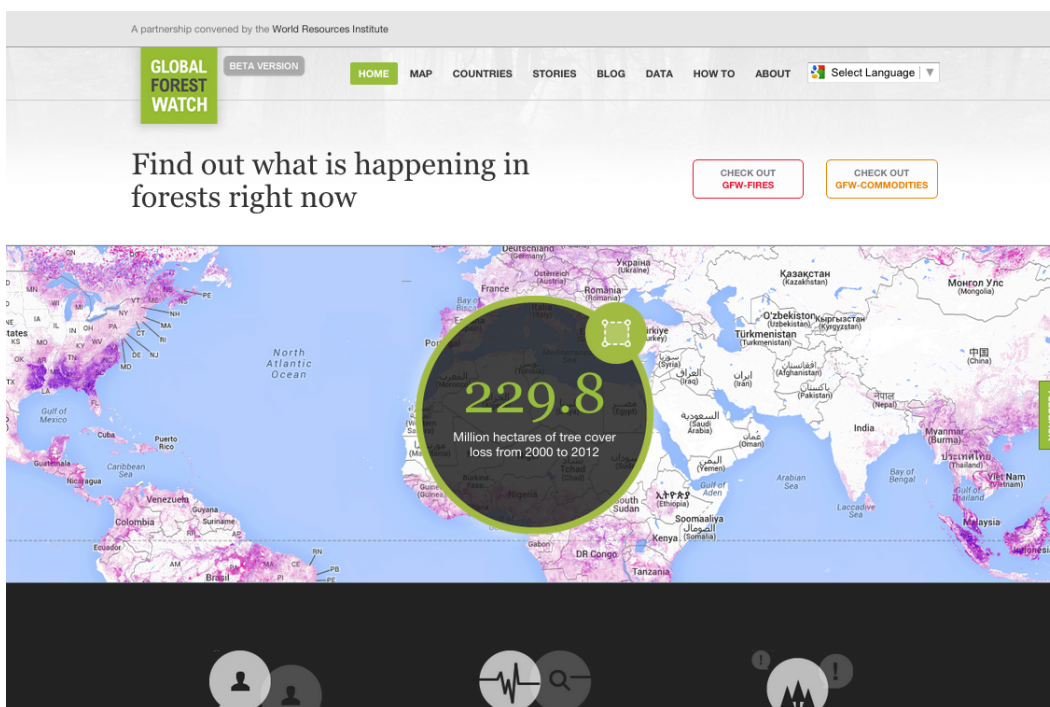


Figure 2: Global Forest Watch provides powerful forest monitoring tools to forest advocates and researchers around the world.

These and other examples of mass collaboration underscore the possibility to mobilize capacity without the aid of traditional hierarchical bureaucracies. Indeed, as governments confront grand social challenges such as climate change, poverty alleviation and the need to generate hundreds of thousands of new jobs, the public service will increasingly rely on broader problem solving networks in which they are just one of many players. However, with an increasingly diverse and tech literate citizenry, there is no reason why governments cannot be at the forefront of harnessing online communities to develop and deliver innovative solutions to the challenges societies face. In fact, we suggest, they ought to be.

## Reinvigorating democracy, accountability and citizenship

Some of the richest discussions during the IOG Dialogue Series centered around the profound changes and challenges unfolding in the realm of democracy, accountability and citizenship. In the years ahead, there will no longer be technological barriers to citizen and business participation in decision making at all levels. Advanced tools – possibly building on gaming and big data technologies – will enable citizens to track the totality of decision making processes and see how their contributions have been (or are being) considered. Current linguistic and cultural barriers will have been largely overcome through use of semantic-based cooperation platforms. Opinion mining, visualization and modeling tools will allow stakeholders to forecast virtual reality based outcomes and scenarios that will help to shape, guide and form public opinion. And so long as the processes and tools to establish trust and authenticity are robust, the outcomes of such consultative processes should be faster, more legitimate and more efficient in terms of revising policy and making decisions.





## Participating in a dynamic future

For governments to participate in this dynamic future, they must begin to evolve new practices and strategies that exploit the available tools. In other words, governments must strive to become a stronger part of the social ecosystem that binds individuals, communities, and businesses—not by absorbing new responsibilities, but through their willingness to open-up formerly closed processes to broader input and innovation.

Present government processes develop laws and regulations, interpret and define societal norms and deliver societal support services. Their legitimacy is derived through democratic processes combined with a requirement of transparency and accountability. In a world that is increasingly using digital communication and borderless interaction, traditional roles and responsibilities of public administration will be subject to considerable change and classical boundaries between citizens and their governments will blur.

The balance of power between governments, private actors and the citizenry will have to adapt to these challenging new possibilities. So too will the governance models, process flows, and analytical tools with which to properly understand, interpret, visualize and harness the forces that could be unleashed by a more participatory and interactive model of government.

Although adapting to digital age realities will be neither easy nor automatic, investments in building world-class digital capabilities inside government will have generous payoffs. Citizens will benefit from more convenient access to modern digital services and from better online engagement with their elected officials. With a few clicks, policy makers will be able to tap the expertise of diverse participants and glean important insights from growing accumulation of open data. Businesses will see dividends in digitally enabled business support programs and in streamlined processes for regulatory approvals. Taxpayers will reap the benefits of greater public sector efficiency due, in turn, to sharp reductions in manual information processing, a reduced reliance on external vendors and expensive proprietary solutions and the cost savings realized as more citizens migrate to less costly digital channels.

Digital transformation will yield softer benefits that are no less important. By closing the digital innovation gap with the private sector, for example, governments can boost public confidence and rekindle citizen engagement. Creating a more innovative, tech-savvy work environment will help public sector organizations attract and retain a highly skilled workforce. A more agile and effective public service is also a key differentiator in making jurisdictions attractive destinations for business investment and the creation of jobs and prosperity.

## Key lessons and recommendations

How can such benefits be realized? This report derives many important lessons and recommendations for aspiring leaders in digital government. Among the key findings:



1. **Digital government is about achieving better outcomes for society.** In other words, digital is less about shiny new technologies than about fundamentally transforming systems and processes and traversing the traditional silos that inhibit collaboration.
2. **Digital innovation doesn't have to be expensive or complicated.** Many transformative innovations don't require a large budget, a huge team, or a complex governance structure. By contrast, digital leaders have prioritized projects that are small, nimble and fast, and only scaled-up or invested in the projects that are proven to work.
3. **Digital government requires experimentation, fast failure and agile development processes** that lead to continuous improvement in products and services. By developing solutions using quick, iterative cycles that involve close cooperation between end-users and developers, organizations can reduce market risks and sidestep the need for large amounts of initial project funding, overly elaborate planning processes and expensive product launches and/or product failures.
4. **Digital leaders design for participation.** Digital innovators don't build products, programs or services for passive audiences; they build products and services that invite participation and collaboration with citizens.
5. **Digital transformation means putting users first.** In so doing, digital leaders have fostered a customer service ethos where digital projects start by pinpointing user needs and understanding how services fit into their lives. This, in turn, means granting the permission and flexibility to rethink and alter the current state, including the very structures of government.
6. **Digital leaders fuse digital with broader public sector reform efforts.** By linking digital innovation with organizational transformation, digital leaders shift the conversation beyond an exclusive focus on technology toward a broader set of public sector performance objectives that all politicians and public servants can rally behind.
7. **Digital leaders attract and develop top talent,** thereby lessening their reliance on consultants and external technology contractors and building up their management capacity for digital leadership. By investing in digital literacy across the public service, they nurture the development of talented individuals who understand and can manage the interface between technology and public service reform.
8. **Digital leaders leverage technology resources more efficiently,** where possible relying on cloud computing, modern technology stacks, reusable commodity solutions and open source.
9. **Digital leaders make rules conform to modern development practices** rather than make their development practices conform to outdated rules. Among other things, this work entails updating HR policies, modernizing procurement rules, and introducing evolved, streamlined governance models.
10. **Digital innovation is constant and requires a strong organizational commitment.** In fact, digital leaders have often established positions of digital authority – often Cabinet level positions – to oversee digital transformation of public service delivery. The results, in these instances, are commensurate with the level of leadership commitment dedicated to maximizing the benefits.

In summary, incremental changes in technology investment and implementation will not be sufficient to leverage the potential value of the digital revolution or to avoid the potential pitfalls. Rather, it is



imperative that elected officials and public servants work together to develop a vision for how digital technology is connected to and embedded in a broader, long-term public sector reform agenda and a strategy to transform how the government operates and delivers the services that citizens and businesses need. In other words, public sector leaders need a transformation strategy that not only continues long-term investment in key information and communication technology assets, but also leverages the power of new technologies such as social media, mobility, analytics/big data and cloud computing to bring heightened levels of innovation and productivity to the many functions and permutations of government.

## 2. The Digital Revolution: Today and into the Future

In the space of a few decades, the digital revolution has transformed the way we work, the way we connect with friends and family and the way we educate, inform and entertain ourselves. It has upended and reshaped countless industries, from software to financial services and media to pharmaceuticals. And as the Internet's influence permeates other aspects of society, it is beginning to profoundly transform virtually all institutions, from education, healthcare and science, to the way we produce and consume energy, to the very nature of government and democracy.

Digital technologies enable new modes of human connectivity and new ways of organizing our knowledge and ingenuity to create change. They not only foster low-cost connectivity across borders, they provide an increasingly rich pallet of data, tools and techniques with which to transform the way we solve pressing challenges like climate change and disease prevention or assess the impact of rising food and commodity prices on poverty. In fact, the opportunities for new innovations, new knowledge and new efficiencies will grow as digital technologies become both more powerful and more pervasive.

One of the most notable things about the digital technology revolution is not only how much it has transformed the way we work, learn, create and connect, but also how fast the underlying technologies and associated public sector applications have evolved. Consider three brief examples:

### Mobile computing

The widespread and growing penetration of mobile devices around the globe makes them arguably the most important of all technologies in the toolkit of digital governments and the communities they serve. Mobile technology offers much more than just a new channel for delivering existing information and services; it provides an opportunity to invent entirely new services and to totally transform how governments operate and engage with citizens. For example, the growing ubiquity and versatility of mobile devices makes it possible to reach remote communities with vital services that are very expensive to deliver through traditional bricks-and-mortar establishments. In health care, mobile applications deployed for public health surveillance, education, diagnosis and remote monitoring can dramatically improve access to health services and save or improve the lives of millions.





**Figure 3: Augmented reality technologies provide new ways to “search” the physical world.**

Mobile data access can also help shed paperwork and permit reinvention of services ranging from security and inspection to licensing and identity management to disaster relief to social support services. Imagine the ability to browse government services and information organized based on the relevance to your physical location; the opportunity to replace reams of paper documents with searchable mobile records or 2-D barcoded hyperlinks, using computer image analysis of neighborhoods for bylaw inspection and enforcement, or perhaps even bringing forensic and diagnostic tools out of the lab and into the field.<sup>1</sup>

## The Internet of everything

The proliferation of wireless sensors and smart devices is giving rise to a seamless computational network that connects every living being and inanimate object on the planet into a global Internet of Everything. Like mobile, the rise of ubiquitous computing and connectivity, and an increasingly data-rich world, will have profound effects—from the ability of policymakers to detect and interpret new patterns and relationships that are integral to understanding the root causes of social and environmental problems, to the use of geographic information systems and remote sensing to provide immediate and increasingly granular feedback to re-engineer traditional programs and services in areas such as transportation, infrastructure management, health care and agriculture.



Figure 4: Santander is deploying the Internet of Things to become one of the world’s “smartest” cities.

The coastal city of Santander in Spain, for example, has deployed more than 10,000 sensors to monitor everything from garbage collection to crime to air quality.<sup>2</sup> Some of these sensors conserve energy by optimizing street lighting, dimming the lights when there is no one on the street, and emitting less light during a full moon than on a rainy night. Sensors in parking spaces direct drivers to available spaces and enable a time-based metering system that matches prices to demand. City buses transmit their position, mileage and speed, as well as data from the ambient environment, such as ozone or nitric oxide pollution levels. Taxis and police cars do the same. Back at the University of Cantabria, which houses the data and the city’s central dashboard, researchers and city officials can observe where the traffic jams are and where the air is bad. Citizens can access all the same data on their smartphones with a few clicks on the Santander’s “Pulse of the City” app.

## Robotics and artificial intelligence

Sped by the exponential rate of technological progress, powerful artificial intelligence and increasingly versatile robots are combining to create a new era of superintelligence that will reshape the social and economic landscape. From robotic surgery to autonomous vehicles and revolutionary biotech automation, the applications for increasingly smart machines will span healthcare, legal and financial services, transportation, construction, agriculture, manufacturing and much more. As companies such as Facebook, Google, Amazon, GE and others make multi-billion dollar investments in talent and research, state-of-the-art AI and robotics capabilities will advance even more rapidly in the years to come, with significant implications for the global employment picture.

While automated factories and self-driving trucks and taxis conjure up notions of widespread blue-collar unemployment, even jobs in the knowledge-intensive service sectors will not be immune to the effects of technological displacement. Information-based tasks like administrative support, basic information brokering, simple software coding and even boilerplate legal work can be done by



computers. So too can financial analysis and stock trading. A great deal of trading is already automated and a new, voice-activated artificial intelligence system called Warren can accurately predict the impact of geopolitical events on asset prices.<sup>3</sup> Ask which stocks will be most impacted by a Cat 4 hurricane in the Gulf of Mexico and Warren will analyse reams of relevant historical data to spit out an answer in nanoseconds.

Narrative Science, a Chicago-based company, has an AI system called Quill that can collect and analyse data and then apply a narrative structure that suits your audience.<sup>4</sup> It is perfectly capable of writing a basic news story or sports report, without any human editing. It can do the same with financial events or business stories, just about anything that involves data, analysis and reporting.



Figure 5: A new generation of AI technologies herald potential to replace white-collar professions.

IBM's supercomputer Watson has recently been deployed in medicine, where it can interpret X-rays, analyze a biopsy and diagnose a patient condition. Its diagnoses are not based on the career experience of a single doctor, but on its analysis of an enormous reservoir of medical data. In fact, Watson's ingestion of more than 600,000 pieces of medical evidence, more than two million pages from medical journals and the further ability to search through up to 1.5 million patient records for further information gives it a breadth of knowledge no human doctor can match.<sup>5</sup>

For many, advanced robotics and artificial intelligence may seem like the stuff of science fiction. But advances in these fields are moving more quickly than most people realize. As laboratory research crosses the threshold into economically viable technologies and applications, policymakers must urgently update their assumptions about the impending age of super-intelligent machines and the new demands it will place on government to address the social and economic disruptions that are sure to follow.



### 3. Towards a New Model of Digital Government: Democracy, Services and Problem-Solving in the Digital Age

The technological capabilities just described are profound, even mind-boggling in their potential. Indeed, the list of novel applications for these powerful tools seems to increase daily. But how can public servants and political leaders harness these diverse and evolving capabilities? Where does one even start? Could public sector leaders drive significant changes to the institutions and *modus operandi* of government based on a very different view of digital technology?

#### From e-government to digital governance

The first-wave of Internet-enabled “e-government” strategies delivered some important benefits. They made government information and services more accessible to citizens while creating administrative and operational efficiencies. But too many of these initiatives focused on automating existing processes and moving existing government services online. The next wave of digital governance presents an historic opportunity to fundamentally redesign how government operates, how and what the public sector provides, and ultimately, how governments interact and engage with their citizens. For example, digital technology provides the platform and the tools to better integrate services in a way that considers a person's preferences, a community's needs and the places and spaces where services are needed most. It could drive a dramatic improvement in the responsiveness of public systems, and an increased ability to focus the energy of all those involved – from officials, to stakeholders to citizens themselves – in setting and achieving goals together. Indeed, it is helpful to start with a fictional, but not improbable vision of how the future of government could be different:

*Imagine a scenario where there are fewer department-by-department mainframes or data centers in the government. Most of the information and applications that underpin public office are run in a virtual cloud of computing capability that stretches across the whole of government. Employees and citizens will search for information from their desktop, just like they do when they're at home.*

*Back in the executive offices of government, there are plasma screens displaying information about tasks happening in the schools, streets and administrative offices of the nation. New tasks on the big spreadsheets come up in yellow, past due tasks in red, and completed tasks in green. Departmental heads are watching it too. They'll be talking over the performance data at a management accountability meeting later in the day. Across town, the head of a non-profit government watchdog is preparing for her primetime media appearance by downloading the same information. In the meantime, she's plotting trends on Google Earth and releasing new insights on her Twitter feed.*

*Some employees find this new openness striking, even unnerving. And it's true; the innovations the government is pursuing are genuinely remarkable at a time when many people associate government with waste and inefficiency. But the boost in public confidence and engagement is proving them wrong and public servants across the country are getting on board.*



*In a recent upgrade, the Head of Digital oversaw a seamless migration from expensive enterprise platforms to Web-based solutions like Google Apps. From e-mail provision, web-based software for word processing and spreadsheets, to YouTube for video-hosting – the costs dropped by 90%. She calls it the government cloud, but think ‘app store for government’—a place where employees can access a vast ecosystem of secure applications and data sets for doing their jobs.*

*Amongst other innovations, a nation-wide data warehouse enables all government employees, citizens and stakeholders to see and help analyze what isn’t working in the whole country. They use the same collaboration tools to identify opportunities to cut across departmental silos, improve policy outcomes, reduce costs, and increase public value.*

As we peer into the future of government, such a scenario needn’t and shouldn’t appear implausible. All of it, and more, is possible today. Public sector leaders can seize this opportunity to demonstrate how knowledge, information, talent and energy can be moved, shaped and channeled in brand new ways, inside, across and outside of the boundaries of government. The sections that follow illustrate how digital technologies are creating exciting new opportunities for transformation in service delivery, policymaking and regulation—transformations that will foster innovation and excellence in government and help launch their practitioners into the future.

## The future of public services

Traditionally, public services have been designed by governments and rolled out to citizens who are expected to comply with the terms and conditions of a program. Sometimes government delivers services directly. In other domains, a broader ecosystem of public and not-for-profit partners delivers the services. In both scenarios, the service is generally designed to be the same for everyone. It is always linear. The model is judged by outputs - how many checks got in the mail, how many calls got answered. Compliance with the rules and regulations that form the design of the service is paramount especially in transactional services.

Today, there is an opportunity for governments to move from a transactional approach to a “holistic”, citizen-centered perspective where citizens themselves play a more active and ongoing role in defining and even assembling the basket of services they need. While there has been incremental progress towards citizen-centric service delivery, there is considerable scope to push the boundaries of citizen-centricity much further, especially given the increasingly powerful tools for digital engagement and collaboration that exist on the Internet today.

True citizen-centricity in government would mean redefining what it means to provide a service (e.g., delivering a benefits cheque) and a shift in focus from the process (i.e., the rules governing the dispersion of public benefits) to the outcomes, such as reducing poverty. It would also mean treating the citizen as an active participant rather than an inert recipient with little to contribute in return. Rather than an unbending administrative, compliance-based culture of government, public service agencies would adopt a professional service culture where the public receives integrated and seamless services that are delivered in partnership with other provincial departments and levels of government.





The complexity of public service delivery ecosystems will make such shifts in culture and approach more challenging in some arenas than in others, particularly in domains such as health care and social services where government delegates service delivery to partners in the broader public sector. Regardless of whether services are delivered by government or by partners in the broader public sector, however, the greatest gains in the new model of public service delivery will be realized when the ‘citizen-collaborator’ becomes a ‘prosumer’ of services – identifying needs and helping to shape their fulfillment.

Traditionally, innovation’s home is at headquarters, where the ‘strategic’ view directs the work of a department. The front lines are tasked with delivering the programs directed by the policy set at the centre. There is a sharp division of labor: policy steers, services row. Citizens are largely passive consumers of services.

Governments should insist on a new kind of public sector culture that isn't dependent on organizational charts—one where an attitude of openness, transparency, accessible information and performance data combines with collaborative tools to make space for collective evaluation, strategizing and action. Policy analysts meets counter staff meets digital coders and Web designers, and their different perspectives help create new insights that lead to new ideas and new approaches for delivering services. Citizens also participate, sharing the same information that is guiding decisions inside the administrative offices of government.

Granted, this is easier said than done. Skills and competencies are needed at the management/leadership level to integrate diverse inputs, assess options and adjust trajectories in real time. Point being: collaboration with diverse participants requires more nuanced and sophisticated governance, not a governance free-for-all. Indeed, we are at a point where technical impediments to harnessing significant digital potential are not the issue – designing new service delivering paradigms and adapting institutional behaviours are the real challenges.

In the course of reinventing service delivery, it’s not sufficient to take a traditional program or service and replicate it online. The digital medium presents an opportunity to re-imagine and re-engineer the service in a way that delivers better outcomes and a better end-user experience. The best digital services provide a simple, streamlined entry point. And despite offering extremely powerful features, they make the service effortless and intuitive to use.

But why not go further? It’s not a stretch to imagine that successful business models could be formed around the exploitation of open public service platforms to create entirely new services or even replace some of those currently delivered by government today. The idea is to emphasize variety and choice in service venues, providers and options, rather than the old model of “one-size-fits-all” government.

The reality is that the self-organized citizens and entrepreneurial firms can invent extensions to existing public services with fewer inhibitions and greater speed than government. A number of years ago, the Power of Information Taskforce, which was established to advise the UK government on how to take advantage of new developments in digital media, recommended that all public agencies in the UK create online innovation spaces where the general public and staff can co-create



information-based public services, much the way companies such as Amazon, Google and Apple enable third-party developers to build extensions to their software platforms. The taskforce also recommended the UK government create a public service R&D function with a “modest fund for leading-edge R&D to continue to test ideas and incubate new capabilities.”<sup>6</sup>

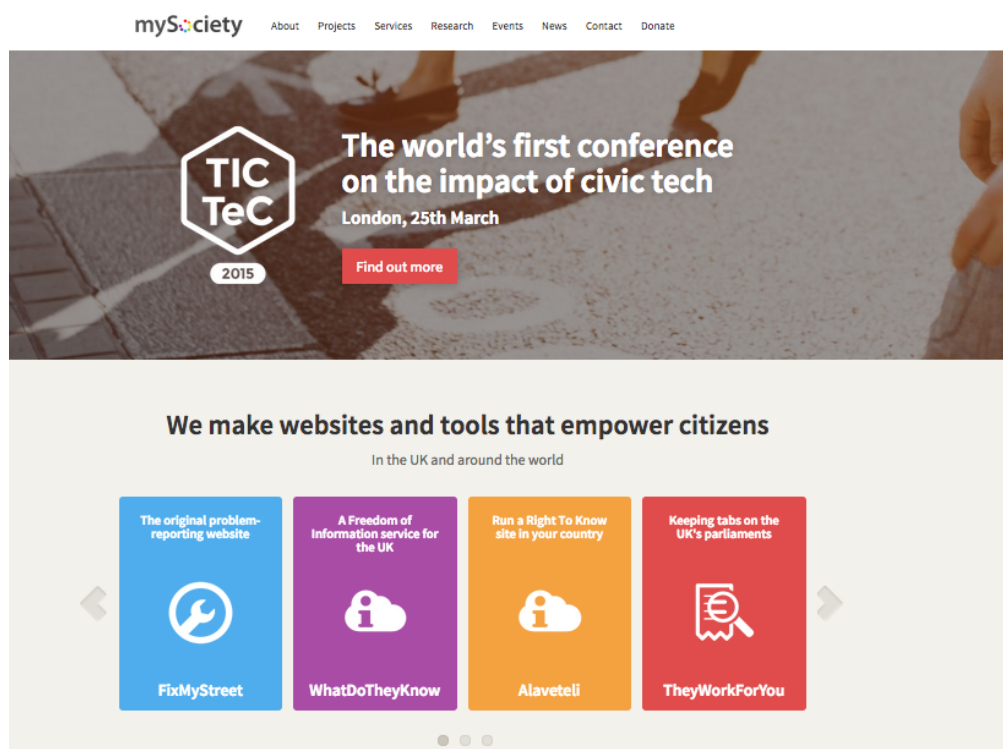


Figure 6: MySociety empowers citizens in the UK to interact with all levels of government.

Tom Steinberg, a member of the taskforce and the founder of mySociety, called the report the beginning of a sea change in the way governments create value for citizens. “When enough people can collect, re-use and distribute public sector information, people organize around it in new ways, creating new enterprises and new communities.”<sup>7</sup> In the past, only large companies, government or universities were able to re-use and recombine information, notes Steinberg. “Now, virtually anyone with an Internet connection can mix and ‘mash’ data to design new ways of solving old problems.”

These observations and recommendations remain relevant to government today. While many governments have made important strides forward with Open Government, the challenge now is to harness open data as a means to unleash fundamental innovation in the design, development and delivery of public services. After all, data sharing is an important driver of economic opportunity and, on occasions, has been known to spark new growth industries. When the National Institutes of Health released data from the Human Genome Project it spurred massive innovation around a new era of personalized medicine. President Reagan’s directive to provide free and open access to the Defense Department’s GPS signals gave rise to a plethora of commercial uses ranging from map-making, land surveying, scientific analysis and surveillance to hobbies such as geocaching and waymarking. In a global age where information can move in milliseconds anywhere in the world, one



needn't necessarily limit innovation to provincial or even national boundaries. Why think locally, when governments increasingly have the potential to tap into innovation all over the world.

Envision a scenario where service providers from all sectors —public, private, and non-profit— could offer up services and citizens could assemble their own customizable packages. There would be true competition among service providers and genuine choice for citizens. Government could continue to develop their own apps to address constituent needs that may be underserved by the market. But other areas—licensing and permits, small business loans and grants, location-based services, for example—would be ripe for competition.

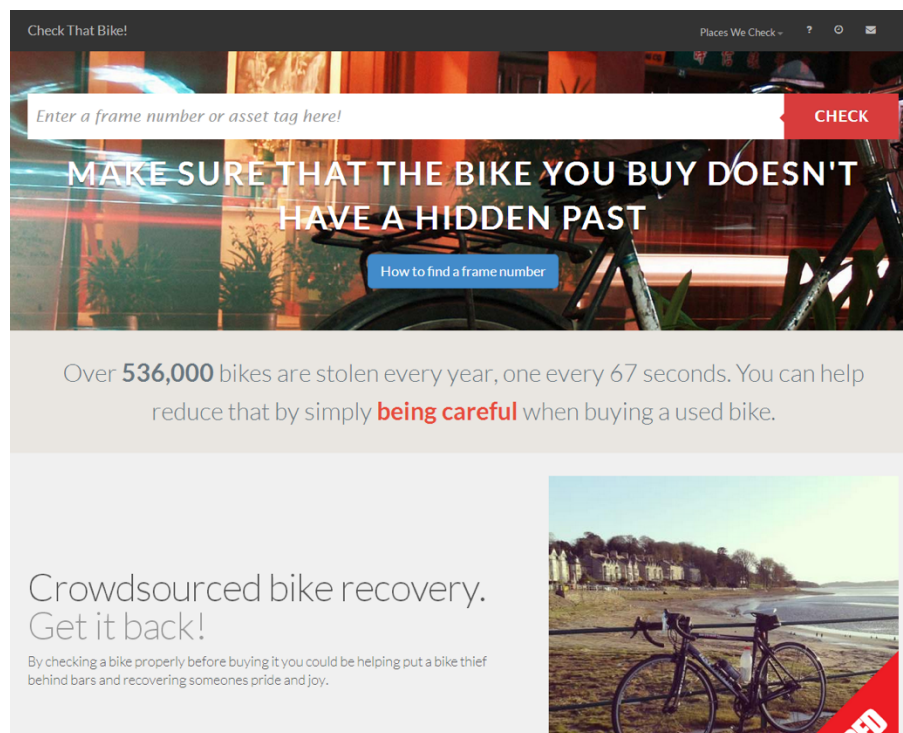


Figure 7: Check That Bike is an award-winning app built on open data in the UK.

Private-sector investment into offerings such as these could catalyze much-needed innovation and potentially lessen the burden on taxpayers. But to manage this change effectively, governments must think carefully about when and where to retain control and how to leverage government's core competencies to create a sustainable and appropriate service strategy. Among other things, public sector organizations will need to guard against threats to consumer privacy, data security and the potential misrepresentation of government content and services by the private sector. If companies and non-profits build new interfaces to popular services, who's accountable if something goes wrong? If a non-profit or business folds, who will ensure service continuity or take custody of personal data? Will governments guarantee that privatized services remain accessible to citizens irrespective of their income bracket?





These are all tough questions. But consider them implementation challenges, not fundamental reasons to delay action. New collaborative models of service delivery are not just possible, but imperative. The big question is, what roles and responsibilities will government, citizens, not-for-profits and business assume in a society where knowledge is everywhere, where hierarchies are anachronisms, and where ‘the state’ is no longer king of the jungle, but part of an ecosystem energized by mass collaboration.

## The future of regulation

Picture a typical morning in a large urban centre, sometime in the near future. Now imagine that a strong, gas-like odor has suddenly permeated parts of the city, forcing several schools and companies to evacuate, and interrupting traffic and commuter train lines. Emergency crews were unable to pinpoint any gas leaks or other causes, despite sending out a fleet of fire trucks and a hazardous materials crew. After searching 140 industrial facilities, the Mayor declares that they had given up hope of finding the source of the mysterious odor. While there were no reported casualties, the uncertainty caused anxiety and fear in a city where pungent odors can raise vague worries about a potential terrorist attack.

Now envision an alternate scenario in which the series of events that bewildered local officials might have unfolded quite differently. The mysterious odor that eluded hazardous materials crews leaves traces of nitrogen dioxide that, in this alternate reality, are automatically detected by tiny wireless air quality sensors embedded in the mobile phones of thousands of nearby commuters. A simple mashup of the data overlaid on a Google map identifies the culprit – a dangerous incinerator that is not supposed to be in use. City officials shutdown the plant immediately and issue a text alert to calm nervous residents who fear that some form of chemical attack had been unleashed.

This account may be fictional, but it is not improbable. Indeed, technologists and science fiction writers have long envisioned a world where a seamless global network of Internet-connected sensors could capture every event, action, and change on earth. With the proliferation of RFID, satellite imagery, cheap personal video recorders, powerful mobile computing devices and an array of Internet-connected sensors, that vision of millions of citizens participating (perhaps unwittingly) in an act of civic regulation is increasingly plausible. Indeed, the question regulators should be asking is whether a combination of new technologies and citizen participation could unleash an era of participatory regulation, where citizens and other stakeholder groups play an active role in designing and enforcing regulations.



Figure 8: Prototyped “eco-phones” come equipped with air pollution sensors.

The idea behind such regulatory crowdsourcing is that just about every area of regulation today—from air and water quality to food safety and financial services—could benefit from having a larger crowd of informed individuals helping to gather, classify and analyze shared pools of publicly-accessible data—data that can be used to educate the public, enhance science, inform public policy-making or even spur regulatory enforcement actions. In fact, we can imagine countless arenas where, if asked, experts and enthusiasts would help to provide data or to analyze existing data:

- Environmental authorities who gather data about air and water quality would benefit from more contributions from local sources and help with understanding the implications of data.
- When epidemiologists gather health data, third parties can help to analyze that data to identify potential threats to public health and correlate health data to location-based factors.
- When policing authorities gather crime statistics, third parties can help to map that data visually and make it useful to citizens in their own communities. They can spot and analyze trends that might not be readily intelligible from the raw data itself.

A scenario where all citizens will suddenly participate en masse is not likely, but nor is it necessary. Even a small, well-organized group of highly-motivated citizens with access to information can use social networks like Facebook and Twitter to make a big impact. To tap this capability, however, regulatory agencies would need to open-up, rethink old processes and supply the tools and data that citizens would need to contribute meaningfully.

Some of the issues that challenge today’s regulators include the slow pace of rulemaking, growing economic complexity, increasing international interdependency and a broadly insufficient capacity

for effective oversight. The failure of financial regulators to detect the Madoff scandal or sound the alarm on ludicrous lending practices and over-leveraged financial institutions is perhaps the most glaring example of regulatory failure. But regulators were also incapable of preventing tainted milk products and toxic toys produced in China from finding their way onto retail shelves in the US and other countries. And the problems hardly end there. Issues as diverse as climate change, water scarcity, emerging technologies, and infectious diseases demand innovative approaches and each issue comes with an impending sense of urgency.

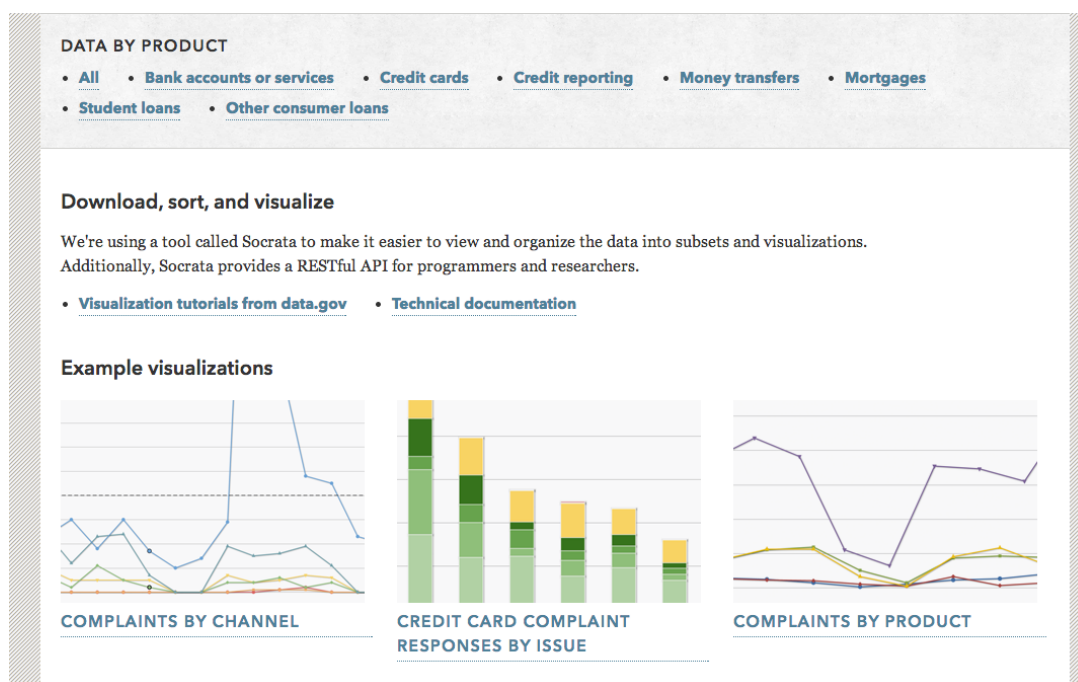


Figure 9: CFPB boosts transparency by sharing its complaints data in easy to understand formats.

In light of these challenges, a growing number of US-based regulatory bodies see social media and online collaboration as a means to provide richer, more meaningful and more interactive pathways for participation by various stakeholders. Some agencies have even placed crowdsourcing at the center of their regulatory strategies. The new U.S. Bureau of Consumer Financial Protection (CFPB), for example, is using the latest crowdsourcing technology to collect tips from millions of consumers about deceptive new financial practices, from misleading mortgages and improper “gotcha” fees on credit cards to outright fraud. This is a stark departure from conventional wisdom. In the old model of financial regulation, regulatory agencies pored slowly and methodically through a sample of the products being offered by banks. But when financial “innovation” outstrips the ability of regulators to catch up, crowdsourcing can make regulators more responsive. Elizabeth Warren, architect of the CFPB, recently said: “The agency can collect and analyze data faster and get on top of problems as they occur, not years later,” adding that the kinds of monitoring and transparency that technology make possible will help the agency ward off industry capture and target their enforcement resources more effectively. It is also enabling a more coherent approach to risk based decision making, so that the agency can focus its inspection and enforcement resources on the higher-risk players.



Figure 10: Croctail is a third-party corporate watchdog app built using SEC data.

Like the CFPB, the US Securities and Exchange Commission is also experimenting with open data and watching the results carefully as a growing number of citizen groups harness the data for their own ends. Take CorpWatch, for example. The San Francisco-based advocacy network hosts a multi-faceted platform for corporate watchdogs that boasts a sophisticated array of research tools that empower amateur corporate investigators operating out of the comfort of their living rooms. Launched in partnership with the Sunlight Foundation in June 2009, the “CrocTail” application on corpwatch.org provides an interface for browsing SEC filings from several hundred thousand US publicly traded corporations and their many foreign and domestic subsidiaries. The app features a world map pinpointing subsidiary locations and an expandable subsidiary tree for navigating corporate hierarchies. Registered researchers can tag subsidiaries with issue notes that are automatically linked to the parent company profiles. There’s even a so-called corporate malfeasance wiki, which covers 15 issues, 35 industries and has detailed profiles on hundreds of companies that are kept up-to-date by volunteers around the world.<sup>8</sup> And in a bid to spawn more powerful research tools in the future, CorpWatch’s open API gives other organizations access to the underlying tools and data.<sup>9</sup> Tonya Hennessey, project director at CorpWatch, says “The CrocTail application has particular relevance at this moment, with the public eye focused on the structural nature of corporate abuses, including multinational tax-avoidance and the use of off-shore subsidiaries to evade responsibility for human rights violations.”<sup>10</sup>

Of course, the SEC would never initiate a project like CrocTail on its own. But the agency’s open data policy means it doesn’t need to. Making the data available for third party reuse allows organizations with the ingenuity and impetus to build public good applications around the data—applications ranging from CorpWatch’s advocacy-driven tools to Brightscope’s financial advisor



directory, an app built on SEC data that allows investors to do due diligence on the performance of thousands of financial advisors before selecting one to manage their money.

The U.S. Environmental Protection Agency (EPA) is yet another pioneer and visible leader in participatory regulation. When the EPA set out to produce an action plan for the Puget Sound estuary system in Washington state it didn't take the usual public policy route – gather a bunch of insiders together to hash-out a policy behind closed doors. Instead they threw up a wiki and launched an Information Challenge that invited the broader community to assemble relevant data sources and begin to articulate solutions. Over 600 residents, businesses, environmental groups and researchers participated and contributed 175 good ideas according to former EPA CIO Molly O'Neill.<sup>11</sup> The results included, among many other things, a tree ring database from 2006 that provides an excellent baseline from which to monitor the impact of climate change on local tree species, wildlife toxicology maps for Puget Sound area, and real time water quality monitoring tools, including water measurements taken from local ferries that could complement existing buoy measurement systems. O'Neill said afterwards, “We can actually use these kinds of mass collaboration tools to transform government, not just add layers to government.” The kinds of “emergent behavior” you see in cases like the Puget Sound Information Challenge can be applied in nearly all aspects of the regulatory systems, leading to new insights, innovations and strategies that even the smartest individuals couldn't produce in isolation.

After all, government can't always anticipate how society's needs may change or all the creative ways in which regulatory objectives could be achieved in the future. Nor can government necessarily afford to supply an ever-growing field force of inspectors and investigators with the capacity to stay current with the latest technical, scientific and industry trends. By open sourcing their approach, and particularly their data, regulatory agencies can stay more attuned to emerging issues and social expectations and also leverage the complementary resources and capabilities needed to address them. To be sure, participatory regulation can only succeed if active and well-resourced citizen movements exist to energize the system.

In the end, the case for participatory regulation boils down to a realization that both the market and government fail to provide optimal regulatory solutions in times of rapid technological and economic change. Fortunately, we need not “choose” between these alternative social arrangements exclusively; some of the most viable solutions to failures of the market and government are realized through the adaptations of citizens, businesses and agencies to the limitations of both systems.

## **Democracy, accountability and citizenship in the digital age**

In a representative democracy, the public traditionally participated in governance primarily through voting. Elected officials rarely sought the expertise of private citizens in making specific decisions about policy. Policy-making was a top-down broadcast model in which a select group of experts with access to privileged information discussed policy options and communicated decisions to the public via mass media.

Much has changed. In today's increasingly complex and fast-changing environment, officials in government are not always in possession of all the information necessary to reach a decision in the



public interest; nor do they always possess the time or the know-how to evaluate the information they have. Policy-makers in government increasingly understand that they must now seek out new partners and participants to help identify problems and create innovative policy solutions using digital town halls and other consultation tools.

Three powerful forces are putting pressure on government officials to loosen their monopoly on the policy-making process. First, rising citizen expectations for involvement in and greater ownership of “their democracy” need to be met to avoid – and help mitigate – growing citizen disengagement from the democratic process. Second, markets, civil society and citizens are harnessing digital technologies to establish robust, far-reaching networks to influence policy – or even make their own – outside of and disconnected from government. And third, global economic, political and societal forces are wresting control over many policy issues and processes from sub-national and national governments, leading to the inevitable conclusion that governments must design policy through networks in which they are just one of many players.

Rather than a conventional closed-door approach, the policy making process of tomorrow will see Internet-enabled networks of participants contribute a broad range of skills, experiences, perspectives and resources to constitute an effective policy-making unit. Depending on the issue, such policy networks would draw participants widely from governments, international organizations, businesses and industry associations, think tanks, academic institutions, civil society organizations such as NGOs, associations, and religious groups, and the general public. In doing so, they would help better connect ordinary citizens to networks and institutions where conversations are happening and help build greater legitimacy for resulting decisions and projects.

Imagine a scenario planning exercise where thousands of connected participants could tap into a vast pool of shared data and adjust decision variables on the fly to see how their choices might impact real people in the future. Stakeholders could forecast, for example, whether investments in pre-school education would yield better poverty alleviation outcomes than, say, investments in reducing the digital divide. Or, in the efforts to tackle climate change, imagine if scientists, policy-makers, environmentalists, investors and ordinary citizens could access comparable CO<sub>2</sub> emission data for all industrial facilities and other human activities such as logging, farming, fishing or mining. And not only access it, but measure, in precise detail, the impact of those activities on our climate in the same way companies apply financial metrics to their investment decisions to understand the bottom line impact.



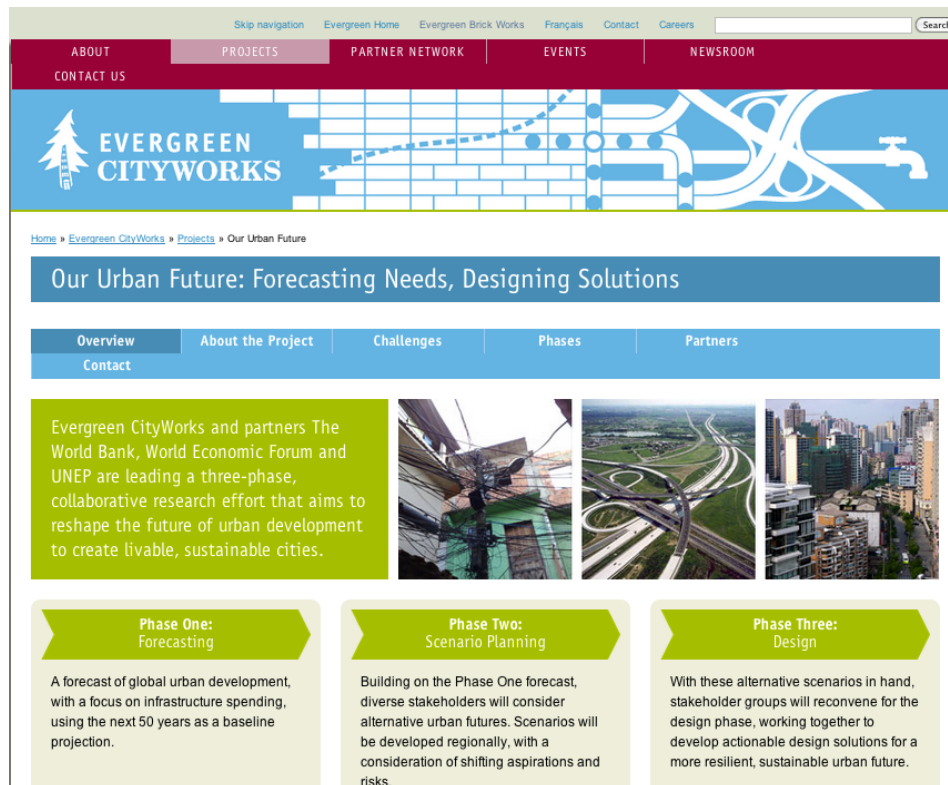


Figure 11: Our Urban Future uses scenario planning and citizen engagement to design urban policies.

Such possibilities are no longer as far-fetched as they sound. The policy development tools available today allow for a much richer dialogue where future scenarios can be visualized and policy options not only discussed, but also evaluated using real data. In 2013 the Toronto-based Evergreen Foundation teamed up with the World Bank, World Economic Forum, UNEP and hundreds of partners worldwide to create a policy network called the Our Urban Future project that leverages a unique form of collaborative forecasting and policy design.<sup>12</sup>

One particularly innovative element of the project includes the use of a dynamic forecasting engine built on an open-platform model that permits users to adjust key variables—for example, the rate of urbanization in Southeast Asia, or investments in transportation infrastructure in Central America—in order to examine the impacts of alternative urban investment scenarios on urbanization challenges. Participants will have access to data on historical patterns, trends and planned expenditures in six key sectors, including transportation, energy, water, waste, buildings and technology. The model will permit “straight-line” forecasts over a 50-year time horizon, allowing stakeholder groups and individual citizens to evaluate their preferred urban investment strategies against various political, social, financial and physical design considerations—a process normally reserved for expert policy modelers.

The scenario planning phase will be complemented by a broad public outreach program that includes extensive crowdsourcing and civic engagement. Additional face-to-face scenario planning exercises will be undertaken in Toronto, New York, London, Singapore, Delhi, Nairobi and Shanghai to



harvest local innovation and catalyze communities around the goal of reimagining (and rebuilding) cities for sustainability. Participants will form into multi-stakeholder teams representing municipalities, industry, non-profits, academia and government. Their job will be to generate visions for the future — visions that are regionally specific, contextual, granular and connected to local conditions. The expectation is that the shared pool of local visions will help surface larger patterns that will be useful in building a global vision for urban infrastructure. And finally, to make this real, a network of “change-labs” will be set up where ideas can be piloted locally, further refined and then propagated internationally if successful.

Reflecting on one of the early stakeholder meetings, Evergreen Foundation executive director Geoff Cape noted that the need for cross-jurisdictional, multi-stakeholder collaboration on the urban agenda is finally being recognized. “Two big ideas that emerged quickly in the program were: A profound lack of vision and values guiding leaders influencing the larger urbanization agenda, and a gap in opportunities for cities to come together, like the United Nations, to share strategies and support work between cities,” he said.<sup>13</sup> “Nation-states are not investing in urban infrastructure strategies such as transportation, water, waste, energy and information and communications technology,” he continued, and to make matters worse this unfortunate dearth of leadership comes at a time when the vast majority of the world’s population is either living in or migrating to major urban centers. Cape argues that the urgency of the urban challenge requires “leaps” rather than incremental evolution, and furthermore that only multi-stakeholder networks can deliver the innovative ideas and capabilities that cities require.<sup>14</sup>

Our Urban Future is still a work-in-progress, but these varied ingredients, strategies and tools position the project to become a major global, collaborative and comprehensive effort for forecasting the future of urbanization and designing effective policies in collaboration with thousands of individuals. While the leadership, in this instance, came from outside of government, social networks and collaboration platforms make the process of engaging citizens in problem solving easier and less costly than ever before. Policy makers can post background information on the Web and use online video conferencing to bring in expert testimony. Web-enabled forums can enable discussion and debate amongst hundreds, thousands, and even millions of geographically-dispersed participants. Wikis provide a platform for collaborative editing of policy documents, while social networking technologies can connect citizens and organizations with common goals and interests.

Moreover, a collaborative approach would yield many benefits, for citizens and policymakers alike. First and foremost, the broader participation enabled through digitally-enabled policy development leads to better ideas and perhaps a greater diversity of ideas as well. Greater inclusion in the brainstorming and decision-making process, in turn, generates a greater sense of ownership when it comes to implementing the results. The digital policy making process facilitates “organizational memory,” leaving a permanent, searchable record of what might otherwise have been water cooler conversations and thus provides a foundation for subsequent discussions. It also dispenses with the old model of atomized input and central processing – think “suggestion box” – in favor of a more collaborative model with tools that enable the creation, learning, shaping, sharing and tracking of group knowledge as the process unfolds. In other words, digital policy brainstorms are conversations that open-up a space for deliberation, analysis and perhaps even compromise among multiple stakeholders. And though existing policy making platforms don’t yet offer this, future iterations





could include advanced tools that enable citizens to track most decision making processes and see how their contributions have been (or are being) taken into account.



Figure 12: Participatory budgeting is an increasingly popular tool for local citizen engagement.

In the final analysis, engaging regular people and experts using the Internet is a straightforward way to both promote democratic engagement and draw in expertise and new ideas to public policy. But there are some unique challenges in applying large-scale collaborative methods to policy development. Citizens in other jurisdictions already crunch numbers to shape policy, challenging official inflation estimates by scraping online supermarket prices, like the Billion Prices Project<sup>15</sup> in Argentina, or scouring traffic stop data for racial bias in New York City to get police policies changed or court cases dismissed in the US.<sup>16</sup> This kind of work transcends the current focus on leadership-driven performance measures, as it involves integrating and analyzing larger and much more complex data sets. It increasingly requires machine learning too: drawing on huge amounts of historical data to “train” new algorithms that sort through and spot anomalies or correlations in past behavior, using them to predict future events, so that precise treatments can be tailored in advance. To do that, policy analysts across government not only need domain expertise and statistical skills, but also comfort with the kinds of powerful computational tools that allow proactive decision-making and the ability to ask questions about analytic assumptions, methodological frameworks, and underlying biases embedded in data.

Evidence suggests that creating an open, nonhierarchical space for ideas focused on change taps incredible energy. But it also creates a major commitment to action when thousands of involved minds come together to set an agenda. While some stakeholders may embrace this new culture of deliberation, others may express reticence. For example, governments tend to emphasize hierarchy



and debate behind closed doors in a culture that is often skeptical of new ideas. Public policymakers must work to reconcile diverse organizational cultures to fully realize the potential for policy networks to add ingenuity, legitimacy and momentum to the work of public policy. The promise of technology-enabled policy networks, however, is that digital engagement will support problem solving approaches that integrate policy development and implementation into a seamless and flexible practice of continuous engagement, improvement and innovation that can reach across communities, provinces and even national borders.

## 4. Mobilizing Capacity: How Leading Organizations are Harnessing Digital Innovation to Further the Public Good

Organizations around the world (public, private and not-for-profit) are actively taking advantage of the tectonic societal shifts unleashed by the digital revolution. Consequently, there is much to learn from leading organizations that are harnessing digital technologies to further the public good—lessons and conclusions that could shape how organizations use digital technology to transform the functions of government. In providing a glimpse of the future of medicine, science, environmental monitoring and the public service, four extraordinary organizations at the forefront of their fields demonstrate how digital innovation is literally reshaping entire sectors of society and demonstrating the scope of what can be achieved with a relatively modest budget but a lot of creativity and imagination.

### **OPENPediatrics: The Future of Medicine and a New Model for Public Service Innovation**

Imagine this scenario: a baby is born in a delivery room of a hospital, not breathing and unresponsive. Doctors and nurses rush it to the neonatal intensive care unit, where a pediatric resident intubates the newborn and starts ventilating to get oxygen flowing through its system: No luck, the infant remains unresponsive and its life is starting to slip away. Then the pediatric resident who is treating the baby remembers a graphic animation from an application that shares best practices around thousands of facets of pediatric care. The animation had demonstrated, in simple and clear terms, how the breathing device was supposed to work. The physician, recalling the animation, sees that one of the valves in the ventilator isn't working. He moves the valve as the app instructed; the device begins to work properly and the baby begins breathing: a life has been saved.

That's not an imagined case, nor speculation. It recently happened at a hospital in Israel, and the program the doctor recalled was created by OPENPediatrics, based 10,000 kilometres away, in Boston.<sup>17</sup> What can be imagined, however, is how that case – and thousands of others – might have turned out were it not for the open knowledge-sharing network that the physician was able to tap into. If the doctor's knowledge had been limited by the education she had received, by the advice of her in-hospital colleagues, or even by the practices sanctioned by her government, that baby may have been lost.



OPENPediatrics is an online community of clinicians sharing best practices using digital learning technologies. Clinicians can access academically rigorous and peer-reviewed content, including guided learning pathways, expert lectures and demonstrations, interactive device simulators, protocols and medical calculators. The community came into existence because traditional walled institutions – whether they be academic, medical or political – often fail to channel and share the almost limitless expertise and knowledge available in all areas of the world. In many cases, those institutions hinder rather than facilitate the sharing of that information.

OPENPEDIATRICS

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About Us Our Community Resources Support Us Help

The world's best practices, shared worldwide.

Currently used in more than 118 countries on 6 continents.

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JOIN OUR COMMUNITY

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**GLOBAL KNOWLEDGE SHARING**

OPENPediatrics is an online community of clinicians sharing best practices from all resource settings around the world through innovative collaboration and digital learning technologies.

Our open access, online educational platform is sponsored by Boston Children's Hospital in collaboration with the World Federation of Pediatric Intensive and Critical Care Societies.

LEARN MORE

**PARTICIPATION AND USE**

Hospitals 784

Countries 118

Video Views 75k

...And growing

Figure 13: OPENPediatrics is a global knowledge sharing community for pediatricians.

## A new paradigm for creating and disseminating medical knowledge

In 2009, Jeff Burns, the chief of critical care at Boston Children's Hospital and faculty member of Harvard Medical School, came up with the idea for OPENPediatrics – a collaborative, downloadable, web-based platform for teaching, exchanging ideas, and sharing best practices in pediatric care.

“Globally, only two per cent of health care dollars are spent on health care education,”<sup>18</sup> says Burns, who remains the program director of OPENPediatrics. And, “even as hard-earned medical knowledge has exploded in the scientific revolution of the last century, the means by which this information is taught has not fundamentally changed.” Outside of medical schools and teaching hospitals, there are few mechanisms for transferring knowledge apart from medical journals and conferences. As a result, the dissemination rates for new practices are shockingly slow. On average, it can take up to 17 years for a new pediatric care technique to get broad-based adoption in the field, and often much longer for developing countries.



Burns explains the problem this way: “Efforts to expand the global access to medical information remain dependent on students going to the place of teachers, or less commonly teachers going to the students in remote parts of the world. Heroic efforts to provide medical missions to fill this gap are noble for the communities that can be reached, but they are inherently ineffective in addressing the scale and scope of the need that exists across the world.”<sup>19</sup>

OPENPediatrics seeks to change that. Recognizing that technology has enabled communications efficiencies inconceivable even a decade ago, Burns aims to tear down the walls of medical schools and teaching hospitals, and, while acknowledging the efforts of NGOs like Doctors Without Borders, he says the key is to make knowledge around pediatric care accessible in the remotest corners of the planet, so doctors and nurses in these places can learn and adapt the best practices in modern care.<sup>20</sup>

Thanks to the ready availability of the Web, and the inexpensive communications technology that makes use of it, knowledge networks like OPENPediatrics transcend the institutions that were once the exclusive domain of ideas. They allow new ideas not only to be shared between people, civil institutions and businesses, but allow those ideas to be improved, shaped and enhanced by a multitude of people. As those ideas spread, they also branch out and evolve, far more quickly than any traditional institution could possibly extend its influence. The fact that they are not institutionally-based is their strength; rather than the traditional concept of ideas flowing from a small group, at the top of a hierarchy, in one direction, OPENPediatrics generates ideas at the ground level, from many people, in multiple directions.

Since releasing in beta in 2010 to a small number of physicians, OPENPediatrics has blossomed into a thriving knowledge network. It is now used by thousands of clinicians affiliated with over 2,300 institutions in 145 countries,<sup>21</sup> and, because it is a self-perpetuating platform, it is almost infinitely scalable. The access is free, and the program is available either online or as a standalone application. Doctors and nurses are encouraged, and expected, to contribute their knowledge and ideas in a continuous dialogue. Indeed, OPENPediatrics depends on its collaborating physicians and nurses for immediate and constant feedback, and in identifying knowledge gaps and to help in filling them. Content is peer reviewed by designated experts who vet contributions to ensure their accuracy and effectiveness.<sup>22</sup>



Figure 14: The OPENPediatrics community spans the globe.

While there has been great progress, one senses that the true potential of OPENPediatrics is only now becoming apparent. After all, why stop at pediatrics? Why not use the same or similar knowledge sharing platforms to transform the teaching and dissemination of medical practice across the board.

### **OPENPediatrics illustrates a new model for public service innovation**

OPENPediatrics is not only a signpost for the future of medicine; it illustrates a profound new model for thinking about the design and delivery of public services and programs. In the new paradigm, programs and services:

- Transcend institutions and jurisdictions, sharing common platforms to create synergies and significant efficiencies;
- Foster a culture of openness and inclusion in the development of and access to data and knowledge;
- Harness self-organization wherein participants self-select for tasks in the network, but communicate and share in a coordinated way using social media; and
- Reflect global best practices and pursue continuous improvement, both in the body of knowledge and the operation of the network itself.

In highlighting the value of innovation, collaboration and self-organization, OPENPediatrics underscores several valuable insights for modernizing public sector service delivery.

Government faces many challenges in pursuing innovation, from an organizational culture that discourages risk-taking to legislative barriers that inhibit the flow of information across departments. Such challenges are frustrating, but they are not necessarily insurmountable when leaders summon the willpower to confront them. After all, organizations outside of government face tough organizational and cultural challenges too. The issues might be somewhat different, but they are systemic challenges all the same. Specialist hospitals like urgent pediatric care facilities, for example,





have long had a proprietary interest in exclusivity within a specific region or market. And many have had outreach programs in other cities and parts of the world where their expertise and knowledge is applied. But those programs are costly, limited in scope and location, and inefficient compared with the concept of leveraging technology to create an always-on network of ideas and best practices that pediatric caregivers can access and contribute to without cost – even if they are in an area without regular Internet access. Indeed, the real strength of OPENPediatrics is its ability to offer a framework for what might usually be competing interests or groups to come together, share ideas and create synergies.

OPENPediatrics began as a collaboration between one hospital, a computing company and a university. But its knowledge-sharing model made it almost infinitely and painlessly scalable. Now it is poised to be on every pediatric caregiver's computer in the world, and able not just to deliver knowledge, but receive it, thanks to a well-designed web-based platform. As both the community and knowledge base have grown, the platform evolved in tandem. New features and new governance processes (including a rigorous system for peer-review) have been added to manage the transition from a hospital-based teaching system to a global platform for pediatric care.

OPENPediatrics has not only broken down the borders between specialty hospitals and remote caregivers, and between disciplines of medicine, but also between political boundaries, affluence and poverty, and even between doctors, nurses, and community health workers who all contribute to the platform. As a paradigm-shifting initiative, OPENPediatrics is also helping, with its technology and collaborative expertise, to reduce the death rate among children, especially in underdeveloped parts of the world with little or no access to advanced pediatric care. A few short years ago, it was inconceivable that a nurse in a refugee camp in Sudan could watch a video, on her cell phone, of the best practices in administering oxytocin to a mother who might otherwise die in childbirth. Now such life-saving interventions can be achieved for almost no cost at all.

In so doing, OPENPediatrics demonstrates that digital innovation is less about shiny new technologies than about fundamentally transforming systems and processes and dismantling or traversing the traditional silos that inhibit collaboration. True digital innovators don't adopt new technology for the sake of appearing trendy; they adopt new technology to help unleash human potential. In other words, the digital innovations that matter are the ones that help people and institutions achieve superior outcomes—outcomes that may have been inconceivable minus the transformative potential of technology and, most importantly, the imagination and determination to deploy it as a force for change.

## Global Forest Watch and the Future of Environmental Monitoring

In the past, natural resource management came down to the capacity of an authoritative, centralized body in a geographic territory to monitor and control the exploitation of a given resource, whether forests, minerals or fisheries. But getting a global picture of natural resource exploitation—like the impact of agriculture, urbanization and global industrial logging on the state of the world's forests—was nearly impossible.



Data on forest cover in countries with advanced regulatory regimes was updated annually, while data for developing nations was updated much less frequently, if at all. Regardless of the source, the data was scattered, inconsistent and unreliable which made assessing the rates of deforestation on an international basis extraordinarily difficult and labor intensive.

For non-governmental environmental organizations like the World Resources Institute (WRI) this state of affairs was deeply frustrating. The WRI dedicates significant resources to monitoring the world's forests. But its reliance on patchy, outdated and unreliable data about forestry practices and forest coverage around the world made it difficult to engage in evidence-based discussions with industry and public policymakers. So the small, DC-based organization set about seeking a digital solution that would improve access to reliable data by radically increasing the transparency of forestry operations around the world.

First, WRI went to Google, hoping that Google Earth might supply it with better information. But Google's imagery wasn't updated frequently enough and didn't have the requisite resolution, especially in unpopulated forest regions. However, Google was quite willing to host WRI's new forest monitoring system on its platform and suggested talking to NASA.

NASA had copious satellite imagery, and was willing to share it with WRI. However, NASA had no way to help WRI analyze the imagery, which left its researchers in a bind. Manually comparing satellite images of the entire globe to detect changes in forest coverage patterns was not even remotely possible.

Then WRI stumbled upon the Center for Global Development (CGD), where computer scientists had been working on algorithms that could compare a series of satellite images and automatically detect any changes in the pattern of forest coverage. And suddenly a solution was born. Google had the platform, NASA had the imagery, CGD had the algorithms and the WRI had the passionate team of forestry experts who worked tirelessly to string it all together. The result, called Global Forest Watch (GFW), is the most sophisticated forest monitoring system in the world.

Today, GFW analyzes the entire planet every 16 days at a resolution of 250 meters. CGD's built in algorithms can automatically detect changes in forest cover, allowing researchers, policy makers, industry and communities to respond to issues immediately. Within minutes, an interested researcher can see the location and duration of a company's logging concessions, look up local forestry laws and regulations, and check whether the logging companies have paid their taxes. Most information can be easily navigated using a visual map interface that taps into a combination of satellite imagery, national forest data sets and "on-the-ground" reports. More advanced users can download geographical data from their warehouse and manipulate it for their own analyses using third party apps.

Several countries using GFW have made significant progress in improving the quality of information gathered about forests and have used this information to police actors that violate their national forestry laws and policies. Instead of traversing through vast tracks of jungle in Indonesia or Brazil, for example, scientists are analyzing GFW's satellite images to shed light on the status of the forests within their national borders, without the need for expensive field studies. In Brazil, deforestation



rates in the Brazilian Amazon have dropped by 80 percent since 2004 thanks in part to WRI's efforts to improve the quality and availability of information about what is happening to those forests and to make it rapidly available to those who can take action.

Similar efforts are being undertaken in Indonesia, where some of the world's largest remaining reserves of tropical forestland are under threat from raging forest fires linked to land-clearing efforts undertaken by the country's biggest commodity producers in wood pulp and palm oil. In fact, WRI's analysis of satellite imagery shows that 57 percent of Indonesia's deforestation is attributable to clearing for palm oil plantations, with another 20 percent resulting from pulp and paper operations.<sup>23</sup> With GFW, governments, companies, and civil society can quickly and effectively pinpoint exactly when and where forest fires are happening and determine who is responsible.



Figure 15: Global Forest Watch enables citizens to monitor logging activities in their communities.

On one hand, Global Forest Watch shows how the ability to monitor the world's forests or understand the ecological effects of global climate change will improve as a combination of satellite monitoring and remote sensors placed in sensitive natural environments gives us instant access to current indicators and data. The granularity and timeliness of the data will not only help establish greater certainty about cause and effect and current and future impacts, it will help provide a basis for sound policy responses.





On the other hand, the WRI's resourcefulness in putting GFW together demonstrates how powerful solutions are possible when you weave together the contributions of multiple participants and institutions. Organizations with very modest resources can build things that even the largest nations have yet to accomplish. And a relatively small DC-based organization can act on a global scale thanks to the platform provided by digital technologies.

## Zooniverse and the Future of Science

Zooniverse is home to the Internet's largest, most popular and most successful citizen science projects. It began with a single project, Galaxy Zoo, which was launched in July 2007 to enable ordinary citizens to help astronomers classify a growing body of images of galaxies throughout the universe. Galaxy Zoo was not only incredibly popular, it produced many unique scientific results, including unique, serendipitous discoveries that have since been published in leading science journals. Today, Zoo Universe participants can hunt for black holes, explore the surface of Mars, find new exoplanets, study sun explosions and much more.

It all started when an astronomy graduate student at Oxford, Kevin Schawinski, faced a rather sizable problem: He needed to sort through 50,000 images of galaxies taken by a robotic telescope and classify each galaxy according to its formation. Even in the age of computer-aided science, each image needed to be closely scrutinized by hand to ensure the classifications were accurate. According to Schawinski, even the smartest and most powerful computers are prone to making mistakes that would never trip up a human.<sup>24</sup>

After spending a week doing nothing else, Schawinski was convinced there had to be a better way. Sitting in a pub one night in the summer of 2007, he complained to colleague Chris Lintott, an astronomer at Oxford, about how long it would take him to go through even a fraction of the images. It became clear he needed help. And Lintott had a suggestion. Why not do what Linus Torvalds did with Linux: toss the problem out to the world and see if anyone in the amateur astronomy community would be willing and able to pitch in.

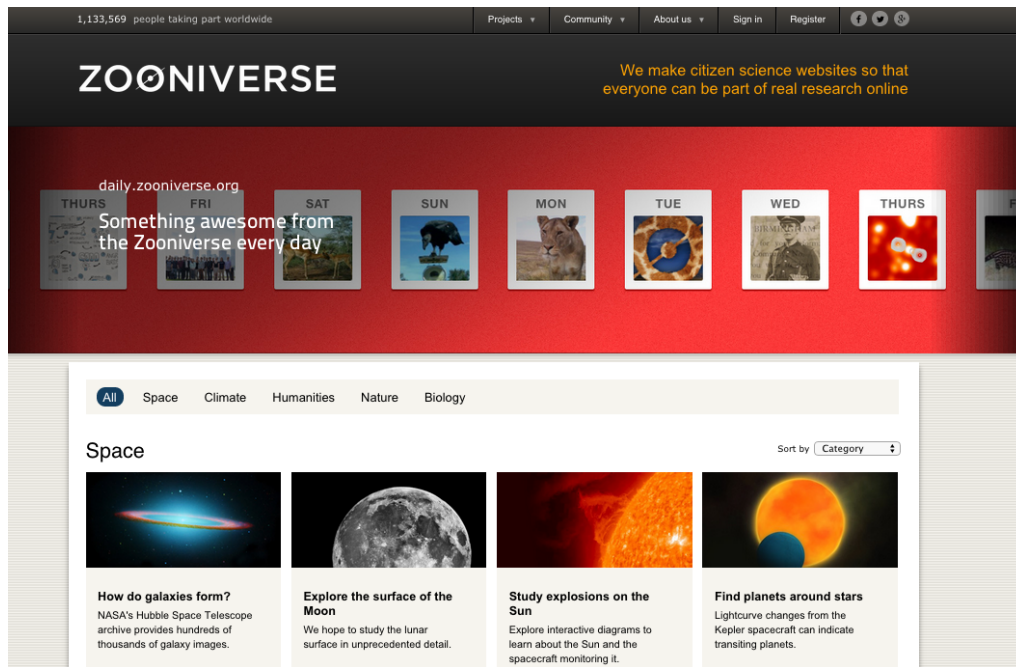


Figure 16: 1.2 million citizen scientists are participating in path-breaking science projects on Zooniverse.

It was an unorthodox notion, to be sure. But, if it worked, Schawinski and his colleagues could vastly accelerate the pace of scientific discovery in their field and investigate possibilities that most astronomers only dream of exploring. They might even end up challenging some of the core assumptions underlying today's scientific institutions—like the assumption that ordinary people can't participate meaningfully in scientific research, except as passive consumers of science journalism or as beneficiaries of scientific advances. So, with the aid of Lintott and several others, Schawinski cooked up a scheme whereby an army of armchair astronomers would help them sort through the millions of galactic images they had stored up in their databases. The result was Galaxy Zoo, a clever online citizen science project where anyone interested can peer at the wonders of outer space, while simultaneously helping advance an exciting new frontier in science.

The premise of Galaxy Zoo was simple. Users would be shown an image of a galaxy and asked two basic questions: Is the galaxy an elliptical galaxy (a type of galaxy with no dust or gas, but many stars) or a spiral galaxy (with rotating arms, like our own Milky Way galaxy); and, if it's a spiral, in which direction are the arms rotating? To participate, users would need to take a 10-minute tutorial teaching them the basics of galaxy morphology. But could it really work? Even Schawinski had his doubts. "I thought there were maybe a couple of dozen hardcore amateur astronomers out there who might possibly be interested in this," he said.

He was wrong.

Thanks, in part, to a story by the BBC, thousands of users were busily classifying galaxy images within the first 24 hours of the site's launch—as many as 70,000 images per hour. Caught totally off guard, the overload on the server storing the images literally melted a cable and nearly derailed the whole



project. But after just a year of operations, more than 275,000 users had made nearly 75 million classifications of one million different images — far beyond Schawinski's original 50,000. If Schawinski was still laboring on his own, it would take him 124 years to classify that many images!

But Galaxy Zoo is about more than just looking at pretty pictures of galaxies. The project has resulted in real scientific discoveries, having published dozens and dozens of scientific papers using the data. The Galaxy Zoo team - which includes astronomers from Yale and Johns Hopkins University in the United States, and the University of Oxford and the University of Portsmouth in the United Kingdom - has often been surprised by the results. Bill Keel, an astronomy professor at the University of Alabama who studies overlapping galaxies, decided to ask Galaxy Zoo users to contact him if they came across an example of this rare phenomenon. Throughout his career, Keel had studied the dozen or so overlapping galaxies then known to astronomers. Within a day of posting his question on the Galaxy Zoo forum, he had more than 100 responses from users who had indeed found such objects. Today, thousands have been identified.

Seven years later, Galaxy Zoo has evolved into Zooniverse and, amazingly, boasts over 1.2 million participants. Since its initial classification project, the Zooniverse community has moved on to tackle a growing portfolio of complementary projects, including virtually all of the big, data-intensive challenges in astronomy. Zoo members can now hunt for supernovae and exoplanets, explore the surface of Mars or simulate cosmic mergers on their computers to help scientists better understand how galaxies form, merge and evolve. There is a project to spot solar explosions and track them across space to Earth. If detected early enough, news of a brewing solar storm can be relayed to astronauts, giving them an early warning if dangerous radiation is headed their way. There is even a new umbrella organization called the Citizen Science Alliance that is nurturing new citizen science projects in disciplines ranging from data engineering to oceanography.

PLANET FOUR

Classify

About

Profile

Discuss

Blog

A Zooniverse project SIGN UP SIGN IN English

Come help explore the surface of Mars

118,144 participants worldwide

4,378,171 MRO images classified

Connect with Us

Follow the project on social media to stay updated on our status and how we are using your efforts to produce science.

f t g+

Start Exploring

Figure 17: An application on Zooniverse allows citizen scientists to explore the surface of Mars.



The increasingly tight-knit community's members range from individuals with no astronomy background, to schoolteachers and students, to parents who participate with their children as a sort of family activity. They share experiences, solve problems together and help educate new members as they join. Some community members have contributed improved user interface solutions, while other Zooites arrange regular meet-ups in places like New York, London and Amsterdam. One could argue that citizen science has become a genuine social movement complete with a shared sense of identity, shared goals and accomplishments, and a social fabric that binds them. On top of all that, broad participation in projects like Zooniverse helps boost the public's general understanding of science, a nice side effect at a time when some degree of scientific literacy is required just to understand, let alone solve, some of our biggest public policy issues.

Now here's a question for government: If ordinary citizens can help transform a modest PhD project into a path breaking global science initiative overnight, what else could digital innovation unleash in the public sector? As the government and other public sector organizations get better about aggregating, organizing and publishing their data, can they mobilize a large crowd of citizens to help extract valuable new ideas, innovation and projects? What new services and public policy insights could be generated as a result? Indeed, if one PhD student can light a spark that transforms the discipline of astronomy, there is no reason why a well-orchestrated effort to engage the public around open data couldn't lead to some profound changes in the nature of government and governance.

## **The UK's Government Digital Service: Disrupting and Transforming Public Services**

As in most advanced economies, a significant majority of adults in the UK are online, with approximately 80% Internet penetration. Completing transactions online has become second nature, with more and more citizens going online for shopping, banking, information and entertainment. Why? Because online services are quicker, more convenient and cheaper to use than alternative channels.

Unfortunately, when it comes to public services, citizens were routinely confronted with poorly constructed websites, and often, a complete absence of intuitive digital options for obtaining information and services from government. In 2010, Francis Maude, the UK's MP for Horsham, West Sussex, lamented the fact that government services had utterly failed to keep up with the digital age. "While many sectors now deliver their services online as a matter of course, our use of digital public services lags far behind that of the private sector," Maude said. Serving as Minister for Cabinet Office, Maude argued that it was unacceptable that 74% of people use the Internet for car insurance, but only 51% renew car tax online. "To win the global race and save hard-working taxpayers money," said Maude, "we need world-class public services available online 24/7 from anywhere."

Along with Martha Lane Fox, the UK's Digital Champion, Maude was among a small group of political leaders and senior executives that argued (successfully) for the creation of a brand new digital organization: a centre for digital excellence with genuine authority to "disrupt and transform" public services. They envisioned a small team made up of UK's brightest digital talent that would work with agencies to remove barriers to exceptional service delivery. If it succeeded, all services in the UK



would soon be “digital by default,” meaning that the digital services are so good that people prefer to carry out the transaction online rather than by phone, post or in person.

That vision became reality in 2011 when the newly minted Government Digital Service (GDS) brought the first cohort of top developers and designers into government. But not just into government at a low level, subservient to existing bureaucracies. Mike Bracken, the former head of the GDS, reported directly to the UK Cabinet Office, and had a role not only in implementation, but in the design of any government policy that includes a digital component. When a policy is proposed that can’t be implemented in a way that citizens can understand or use, he and his team were given the power to push back. They also have the power to directly design, build, and deliver many services, at a fraction of the cost, without resorting to complex external procurements.

Over the course of three years, GDS has hired close to 300 staff, shipped award-winning services, and begun the long and arduous journey of completely revolutionizing the way that 62 million citizens interact with more than 700 services from 24 government departments and their 331 agencies.



Figure 18: Mike Bracken, former head of the UK’s Government Digital Service.

### **A top down mandate to disrupt and transform**

The formation of Government Digital Service came as a response to a fundamental dilemma facing reformers in the public service. No amount of good programming will result in simple, beautiful, and easy-to-use digital services as long as the delivery teams are just taking orders from a regime addicted to complex rules and processes. Indeed, radical service transformation often requires extensive investment of time and resources, changes to primary legislation, and substantial re-engineering or replacement of the processes and technical systems that support a transaction. To succeed, the GDS required not just talented coders, but savvy political operators that could help dismantle the tyranny of overly complex business rules and processes that were strangling government’s ability to deliver on its mission and establish a new approach to service development fit for the digital era.





To do all this, the GDS got what many other aspiring digital government outfits lack: power, staff, and the political authority to leverage both. GDS controls access to the British government’s domain names, so the 300-person team has been methodically building better digital services for virtually everything the government does—and then simply shutting down the lackluster services that previously existed in those spaces. It has the backing of a Cabinet Office, which sees the GDS as a lynchpin in the efforts of the government’s broader Efficiency and Reform Group. And, in addition to top digital talent, the GDS has an exceptional team of procurement, human resources, and finance experts that have led efforts to find solutions to management challenges that prevent progress in achieving high-quality service delivery in the public sector.

The work of the GDS hasn’t been flashy apps but rather simplicity: a paring down, and reordering of priorities and processes that allows for an online experience of government that is on par with the best digital services offered in the private sector. Open source, open data and cloud technologies have become the new standards, replacing the government’s dependence on antiquated technology stacks and proprietary code. The days of the fabled multi-year, multi-billion pound government IT contracts are over, replaced with shorter procurements, preferably with SMEs. Waterfall methods for developing public services, with their long and laborious planning cycles, have been swapped for the agile development methods of Silicon Valley startups. And a new, streamlined digital by default service standard, which sets out clear guidelines for building world-class digital services, supplanted the complex and confusing thicket of rules that was inhibiting progress.

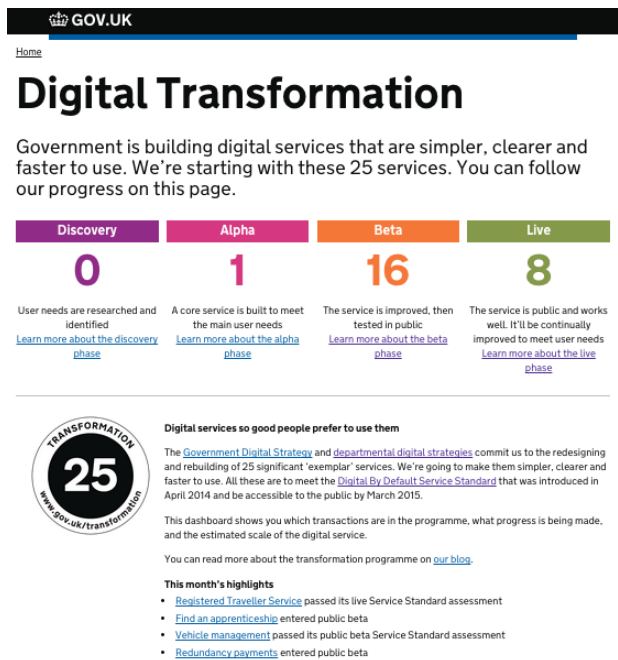


Figure 19: GDS displays a detailed public dashboard tracking its digital transformation progress.

All considered, the GDS and its commitment to making every service “digital by default” represents a radical change in the way that public services are designed and delivered. Reflecting on the work of developing the new GOV.UK platform, Bracken had the following to say about the process:





“When we created GOV.UK, we created an alpha of the service in 12 weeks. Its purpose was to create a working, but limited, version of what GOV.UK could become. We made it quickly, based on the user needs we knew about.

As we moved towards a Beta version, where the service was becoming more comprehensive, we captured thousands of pieces of feedback, from user surveys, A/B testing and summative tests and social media input. This went a long way to inform our systems thinking, allowing us to use the appropriate tools for the job, and then replace them as the market provides better products or as our needs change. This of course precluded lengthy procurements and accelerated the time taken for feedback to result in changes to live services.

In the first 10 days after we released the full version of GOV.UK in October 2012, we made over 100 changes to the service based on user feedback, at negligible cost. And the final result of this approach is a living system, which is reactive to all user needs, including that of policy colleagues with whom we work closely to design each release.”

In the end, a strategy driven entirely by focusing on user needs produced the desired result: a simpler, quicker, easier way to find information and transactions for British citizens.

## New York City’s Chief Digital Officer: Providing Leadership for Transformation

In 2011, then Mayor Michael Bloomberg and Commissioner Katherine Oliver introduced the world’s first Chief Digital Officer in government, and made a powerful commitment to New York City’s innovative future. At the same time, the Mayor announced New York’s first Digital Roadmap, an ambitious 40-point plan with a simple goal: making New York the nation’s number one digital city, in both the private and public sectors. Six years later, numerous cities across the globe have followed suit, recognizing the need to boost their digital capabilities as technology transforms the world.



Figure 20: Rachel Haot, former Chief Digital Officer for NYC.



The role of Chief Digital Officer (CDO) is still unique within government, though it is increasingly common in the private sector. Savvier about business than your typical CIO, and more tech literate than your average CEO, most CDOs bring a powerful combination of technology and business smarts together to lead strategic business-focused initiatives that harness digital technologies. In the private sector, CDOs drive growth by converting traditional “analog” businesses to digital ones (e.g., the equivalent of turning a bricks-and-mortar book retailer into Amazon) and oversee operations in the rapidly changing digital sectors like mobile applications, social media and digital marketing. In the public sector, CDOs are often responsible for digital services, data science and other cutting edge applications of technology to government.

In the context of New York, and against the rapidly changing backdrop of the digital sector, New York’s CDO takes a global view of technology across the City government, bringing together insights and capabilities that span more than 80 agencies to construct a strategic plan for optimizing and implementing digital resources that serve the public and equip senior decision-makers to make evidence-based decisions.

The Chief Digital Officer leads NYC Digital, a team that functions like a startup, providing strategic guidance to digital professionals across City government and implementing innovative initiatives and public-private partnerships. Now with the backing of Mayor de Blasio, NYC Digital serves to ensure that the City of New York made significant progress on five key digital priorities:

- Building public infrastructure to foster digital inclusion,
- Modernizing government service delivery,
- Engaging constituents via social media,
- Boosting economic growth by developing New York’s technology sector, and
- Providing digital education opportunities to New Yorkers of all ages.

Since the introduction of the Digital Roadmap in 2011, NYC Digital has made significant progress in all five domains. For example, the City of New York has led the nation in Open Government achievements, including the release of thousands of public data sets, the convening of the first municipal hackathons and the passage of Local Law 11, the most progressive open data legislation in the country. Over 300,000 low-income residents have gained access to the Internet through City programs. Public Wi-Fi access has been installed throughout the NYC transit system. The City’s technology sector has blossomed to over 1,000 made in NY technology companies thanks to an ambitious business acceleration strategy. Over 40 digital learning programs launched in partnership with post-secondary institutions have served over 1,000,000 New Yorkers. The City’s social media audience has more than tripled, growing from 1.2 million to a current peak of 3.7 million social media followers. And, the highly popular 311 service has been migrated to smartphones, Twitter and live chat.

Although the accomplishments listed above speak to the breadth of achievement across all five priorities, consider in more detail the progress made on two of those files: digital inclusion and open government.



## Fostering Digital Inclusion

In a city that still struggles to combat poverty and discrimination, over a dozen new initiatives have enhanced Internet infrastructure, increased adoption of digital services and expanded Wi-Fi coverage across the city in an effort to foster digital inclusion. Programs implemented by NYC Digital include Connected Learning, which provides training, discounted broadband, technology curricula and equipment to 23,000 sixth graders and their families. 100 new or upgraded public technology centers have been set up in public libraries, recreation centers, public housing and community centers. A Digital Vans program transformed cargo vans into mobile technology centers that travel across housing developments in all five boroughs to provide Internet and computer access. And, Wi-Fi coverage has been dramatically expanded by installing Wi-Fi and cellular service in public parks and underground stations, and by repurposing existing infrastructure, including augmenting public pay telephones with Wi-Fi hotspots available to the public. Today over 99% of New Yorkers have residential access to high-speed broadband, and the City intends to build on this reach until Internet access is truly ubiquitous.



Figure 21: Digital Vans bring mobile computing labs to low-income neighborhoods.





Figure 22: Payphones in New York City have been converted into free mobile hotspots.

## Setting the Benchmark for Big Data and Open Government

Like most large municipalities, New York City is sitting on a treasure trove of data. In fact, what the city knows about its 8 million residents is staggering. Contained in public archives is information about their boilers and their sprinkler systems, the state of their local taxes, the number of heart attacks and fires that occur inside their buildings and whether they have ever logged complaints about roaches or construction noise. Additional data is gathered about their businesses, their commuting habits and their children's test scores.

If a parking meter sits outside their apartment, the city knows how many cars have parked there on any given day, the number and dollar amount of tickets handed out and, of course, the identities of those who have received them.

The problem for New York, as in most governments, is that much of this data has been underutilized until recently, with little investment in figuring out how to mine its social, intellectual and economic potential. “We eventually realized there was enormous value in using all our data — together and proactively,” said Dr. Amen Ra Mashariki, the Chief Analytics Office to Mayor de Blasio. “We’d already done the retroactive act of looking back for accountability’s sake. So we tried to use the data prescriptively to figure out what might be coming next.”

One of Mayor de Blasio’s first acts in coming into office was to strengthen Local Law 11, which requires New York City agencies and departments to make this vast reservoir of data available to the public using open standards. The law’s chief provision created a clearinghouse called the Open Data Portal, which offers to the public hundreds of sets of city data, including the location of Wi-Fi hot spots, the results of restaurant inspections, yearly power use by ZIP code, maps of public parks and, perhaps most importantly, a detailed, machine-readable version of the city budget.

Releasing the data was just step one. NYC also created an internal data science team – otherwise known as the Mayor’s Office of Data Analytics – to help put the data to work in creating a more agile, effective and evidence-based approach to delivering programs and services. For the modest sum of \$1 million, and at a moment when decreasing budgets have required increased efficiency, the in-house data analytics office has over the last three years leveraged the power of data to double the city’s hit rate in finding stores selling bootleg cigarettes and helped steer overburdened housing inspectors — working with more than 20,000 options — directly to lawbreaking buildings where catastrophic fires were likeliest to occur.

The in-house data science team is pivotal in leading the quest to extract insights from the City’s data. But Mashariki, who is also responsible for managing the team and works closely with the CDO, spends a great amount of his time designing and implementing new ways to encourage the widest possible variety of people to use the information on the Open Data portal, including other agencies, non-profits and entrepreneurs. He recently worked with the Office of Financial Empowerment, a city agency that helps low-income residents, to hold a hackathon at which tech geeks using information from the portal built an internal scheduling system for the agency’s counselors.



Mashariki’s most ambitious plan was a proposal to move beyond public information into the deeper and possibly more profitable mine of social-media data. Every day, he said, there are 250,000 New York-centric posts on Twitter alone — some concerning trash complaints, others unsanitary restaurant conditions. “If Young & Rubicam can use tweets to sell you stuff,” he asks, “why can’t the city use them to make you less sick?”



Figure 23: Crisis maps helped guide emergency responders during Hurricane Sandy.

The point, according to Mashariki, is that open data can do much more than boost transparency and accountability in government. It holds the potential to help streamline intra-governmental and inter-governmental communication and interoperability, permit the public to assist in identifying efficient solutions for government, promote innovative strategies for social progress, and create economic opportunities.

## 5. Ten Rules for Digital Innovators

Zooniverse, OPENPediatrics and Global Forest Watch represent exemplary uses of technology to address fundamental problems facing scientists, health care practitioners and environmental regulators and advocates respectively. In government, The UK and New York City have harnessed digital innovation to realize greater efficiencies and ingenuity in public service delivery—lessons and conclusions that should inform government efforts to deliver high-quality public services to citizens with greater agility and lower costs. Together, these examples reveal a series of core lessons and principles that are useful to anyone seeking to design and implement digital solutions that further the public good.





## **Rule #1 Digital innovation is about achieving better outcomes for society**

Across these three examples we find that digital is less about shiny new technologies than about fundamentally transforming systems and processes and dismantling or traversing the traditional silos that inhibit collaboration. True digital innovators don't adopt new technology for the sake of appearing trendy; they adopt new technology to help unleash human potential. In other words, the digital innovations that matter are the ones that help people and institutions achieve superior outcomes—outcomes that may have been inconceivable minus the transformative potential of technology and, most importantly, the imagination and determination to deploy it as a force for change.

Ken Burns at Boston Children's Hospital didn't build OPENPediatrics because he wanted his hospital's teaching methods to be more like watching a short video on TED. He built OpenPediatrics to fundamentally reinvent the way medical knowledge is created and disseminated. In doing so, OPENPediatrics has not only broken down the borders between specialty hospitals and remote caregivers, and between disciplines of medicine, but also between political boundaries, affluence and poverty, and even between doctors, nurses, and community health workers who all contribute to the platform.

OPENPediatrics is also helping to reduce the death rate among children in areas of the developing world where access to advanced pediatric care may be reduced, due to its technology and collaborative expertise. Health professionals from around the world can now get instant access to educational videos and courses to help administer critical care to children and mothers through multiple platforms, such as their mobile phone, at almost no cost at all.

## **Rule #2 Digital innovation doesn't have to be expensive or complicated**

Digital innovation does not, by definition, require a large budget, a huge team or a complex centralized governance structure. In fact, such attributes are generally antithetical to the ethos that underpins some of the world's most successful digital projects. After all, Wikipedia became the world's largest encyclopedia by some distance without a corporate headquarters, paycheques or a top-down management structure to tell everyone what to do. Like Wikipedia, many digital leaders are operating on a shoestring, but they leverage enormous talent pools to make up for a lack of financial resources.

Zooniverse got started for a few thousand dollars and some beer money. Today it's one of the most important projects in science, thanks in large part to its massive volunteer team of 1.2 million citizen scientists – a team that is passionate about the work it does and feels like a genuine extension of the scientific community. Similarly, it took several years to build Global Forest Watch, but the World Resources Institute managed the investment in time, dollars and resources thanks to an extensive network of over 40 partners that contribute to the project.

Over the decades, governments have tended to invest in big, expensive cathedrals: long and elaborate technology projects that are developed according to an intricate plan and managed by a centralized team. As governments pursue digital innovation, they will need to prioritize projects that are small,



nimble and fast and then only scale-up and invest in the projects that are proven to work, which leads to rule number three.

### **Rule #3 Digital innovation requires experimentation, fast failure and agile development processes**

Digital innovation may not require large budgets and overly elaborate controls, but it does require taking risks, fast failure and agile development processes that lead to continuous improvement in products and services. In the conventional “build it right, first” approach to technology-based products and services, teams develop products in secret until every feature is defined according to a detailed specification. They prepare for the big launch and hope they’ve built a product that someone actually wants. The downsides are that developers risk misjudging the needs of the market and/or losing first-mover advantage to rival teams that get their product to market first. Either scenario can lead to expensive product overhauls and failures.

The agile approach to application development is best articulated in the book *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses* by Eric Reis. In the book, Reis claims that startups and other organizations can avoid expensive failures and shorten their product development cycles by adopting a combination of business-hypothesis-driven experimentation, iterative product releases, and what he calls “validated learning”. By developing solutions using quick, iterative cycles that involve close cooperation between end-users and developers, Reis argues that organizations can reduce market risks and sidestep the need for large amounts of initial project funding, overly elaborate planning processes and expensive product launches and/or product failures.

In the validated learning approach, organizations start by developing a minimum viable product, with a minimal feature set, and test it with users as early as possible. They then refine the product based on user feedback and start the cycle again, tweaking the product, adding only essential features and testing them again until a satisfactory product is completed. The approach ensures that the producer does not invest time designing features or services that users do not want.





**Figure 24: The Lean Startup, a Bible for digital innovators.**

While Reis' book has become something of a bible for Silicon Valley start-ups, its insights are equally valuable for organizations in the public and non-profit sectors. Indeed, the digital pioneers featured above exemplify the “validated learning” approach.

Zooniverse did not set out with the bold intention to reinvent data-intensive astronomy projects. Nor did it establish a detailed product architecture and roadmap with an elaborate feature set for the dozens of citizen science projects it hosts today. It started with just one galaxy classification project and built on its track record of success, adding new features and projects in response to input from its community of contributors and scientists.

OPENPediatrics began as a collaboration between one hospital, a computing company and a university. But its knowledge-sharing model made it almost infinitely and painlessly scalable. Now it is poised to be on every pediatric caregiver's computer in the world, and able not just to deliver knowledge, but receive it, thanks to a well-designed web-based platform. As both the community and knowledge base have grown, the platform evolved in tandem. New features and new governance processes (including a rigorous system for peer-review) have been added to manage the transition from a hospital-based teaching system to a global platform for pediatric care.

As the WRI continues the ongoing development of Global Forest Watch, it too is working closely with its stakeholders to test and launch many new powerful features. For example, communities will be able to engage with the forestry industry directly as companies sign-on to use GFW to report to the public on their forestry operations. Now companies criticized by Greenpeace for unsustainable forestry practices, for example, will have a credible way to demonstrate that they are logging more sustainably. Civil society watchdogs, meanwhile, will be equipped with powerful tools for monitoring compliance with industry commitments.

#### **Rule #4 Digital leaders design for participation**

A survey of the world's most successful and transformative digital projects reveals a common attribute: Digital innovators don't build products, programs or services for passive audiences; they build products and services that invite participation. Just as there is no YouTube or Facebook without millions of users uploading their content, there is no Zooniverse without its army of citizen scientists, no OPENPediatrics without doctors and nurses contributing and vetting content, and no GFW without the global network of forest watchers to help monitor logging operations around the globe.

Governments could learn a lot from these participatory models. In fact, there are many domains where the participation of citizens and stakeholders could enhance public sector programs and services as jurisdictions like New York City have demonstrated.

Since the appointment of its Chief Digital Officer, New York City has independently hosted six hackathons, including events organized by NYC BigApps and the Department of Consumer Affairs.



In addition, the City has participated in more than 20 external hackathons, ranging from HackNY to Techcrunch Disrupt—fostering deeper collaboration with the technology community.

New York has also seized opportunities to gain valuable insights by empowering its 8.4 million residents to report at scale on emergencies, natural disasters and other urgent scenarios. When Hurricane Sandy descended on New York City, engagement on social media kept the public informed and provided an invaluable window into the needs of New Yorkers. Going forward, the City is also exploring the potential build crowdsourcing functionality into the 311 system that would allow officials to direct outgoing context-specific questions for voluntary response to members of the public. Deeper integration into City service platforms would allow the City to better operationalize the resulting situational awareness insights and help to inform disaster response and recovery efforts by funneling vital and life-saving information to first responders.

## **Rule #5 Digital transformation means putting users first**

In putting users first, digital leaders foster a customer service ethos where digital projects start by pinpointing user needs and understanding how services fit into their lives. This, in turn, means granting the permission and flexibility to rethink and alter the current state, including the very structures of government. Whether the users are members of the public, business owners or government employees, public servants must include real people in the design process from the very beginning. In other words, the needs of people should drive everything from the service design decisions to the technical implementation.

The “putting users first” approach contrasts with the way services have typically been designed in the past in which the internal logic, processes and prerogatives of the bureaucracy sometimes trump the needs of the users of public services. As Mike Bracken explains:

“For digital services, we have traditionally started with a detailed policy. Often far too detailed, based not just on Ministerial input, but on substantial input from our existing suppliers of non-digital services. Subs to Ministers, private office communications, correspondence across departments and occasional harvesting of consultation feedback all go into this mix. Rarely, if ever, does user need get a look-in. User need, if referenced at all, is self-reinforcing, in that the internal user needs dominate those of users of public services. We then look to embed policy in current process, or put simply, look for a digital version of how services are delivered in different channels. This is why so many of our digital services look like clunky, hard-to-use versions of our paper forms: because the process behind the paper version dictates the digital thinking.”

Then, according to Bracken, things take a turn for the worse. The policy and process are put out to tender, and the search for the elusive ‘system’ starts.

“Due to a combination of European procurement law and a reliance on existing large IT contracts, a ‘system’ is usually procured, at great time and expense. After a long number of months, sometimes years, the service is unveiled. Years after



‘requirements’ were gathered, and paying little attention to the lightning-quick changes in user expectations and the digital marketplace, the service is unveiled to all users as the finished product. We then get the user feedback we should have had at the start. Sadly it’s too late to react. Because these services have been hard-wired, like the IT contract which supplied them, our services simply can’t react to the most valuable input: what users think and how they behave.”

The policy led digital service creation described by Bracken undermines responsiveness, builds in long-lead times and results in services which are dictated by legacy IT thinking, not by user needs. The GDS flipped this process on its head, trying at all times to make user needs the driver for all decisions.



Figure 25: The “digital by default” credo reminds GDS staff of their mission.

Other digital leaders have followed suit. On the recently revamped NYC.gov platform, user needs come first. Information is organized by content category, not agency, so that users do not need to know the actionable owner of the function to resolve their concerns. The “look and feel” features a simplified, streamlined design with a brighter color palette, larger images, bigger text size and both live and on-demand video embedded directly on the homepage, enabling the user to easily search, browse information or locate programs in over 100 languages. Users can now launch a service request or find 311 information directly from the homepage and are able to more seamlessly share content to social media networks such as Facebook, Twitter and Google+, encouraging more New Yorkers to discover relevant resources. As Rachael Haot put it “The goal was not merely to meet standards for existing municipal web destinations, but to provide a superior experience that rivals the best-designed, most intuitive platforms across both public and private sectors—and to set a new bar for government websites.”





## Rule #6 Digital leaders fuse digital with broader public sector reform efforts

Digital leaders recognize that digital technology is not an end in itself, but rather a platform on which to catalyze public sector innovation and enhance the performance of government. As the preceding examples illustrate, digital leaders are using technology to improve decision-making and channel greater ingenuity from citizens and the private sector into efforts to solve major challenges; to streamline regulatory approvals and better target inspections; and to offer citizens more convenient, higher quality services, for less cost. In other words, digital innovation is not merely an issue for IT professionals; it is a priority for public sector executives and business leaders too.

Whether improving services or gathering evidence to inform policy decisions, the true promise of digital innovation will only be realized when connected to broader public sector efficiency and reform efforts. As Mike Bracken put it “digital service design means designing the whole service, not just the digital bits. If you’re redesigning a service, you need to think about the organization that runs it.”

By linking digital innovation with organizational transformation, the public service can shift the conversation beyond an exclusive focus on technology toward a broader set of public sector performance objectives that all politicians and public servants can rally behind.

## Rule #7 Digital leaders attract and develop top digital talent

In building new digital units, New York City, the UK’s Government Digital Service and the Digital Service in the US have all recognized the need for talented people working in government who have experience creating modern digital services. This includes bringing in seasoned product managers, engineers, and designers and people with established connections and experience in private industry like New York City’s Rachael Haot and Mikey Dickerson who left Google to lead the US Digital Service after serving as a key figure in the team that rescued the failed implementation of HealthCare.gov. It also means empowering young digital natives who instinctively understand digital. After all, Kevin Schawinski was a PHD student when he became the driving force behind Galaxy Zoo. Cynthia Hamilton, who manages GFW, is a twenty-something too.

Regardless of age, building a skilled in-house digital team has many advantages. First, a strong, in-house team enables the public service to own the service design process. Ownership of service design, in turn, is vital to building services that meet the needs of citizens. According to Rachael Haot, formerly of NYC Digital, “Design is not the act of mocking up a website or making pretty icons. Design is the act of determining what you are building and why, and using that knowledge to guide every product decision.” In other words, the design process answers the key questions behind your product or service: Who is our audience? What problem are we solving for them? How will the audience consume our product: With a computer? Over the phone? In person? And how will you know whether our product is successful? “It’s important that civil servants answer these questions instead of asking someone else to do it for them,” says Haot. In fact, answering fundamental questions about how best to serve citizens effectively should be “Job 1” for the entire organization.



Figure 26: NYC Digital organized a two-day hackathon to reinvent its homepage.

By having a skilled digital team within government, digital leaders have also lessened their reliance on external technology contractors. And, by investing in digital literacy across the public service, they have nurtured the development of talented individuals who understand and can manage the interface between technology and public service reform.

### **Rule #8 Digital leaders leverage technology resources more efficiently**

At a time when IT-related spending is often associated with inflated costs and misspent resources, digital leaders have taken steps to leverage their technology resources more efficiently, relying, where possible, on modern technology stacks that enable development teams to work efficiently and services to scale easily and cost-effectively. The Digital Service Playbook in the US, for example, encourages digital services teams to consider using open source, cloud based, and commodity solutions across the technology stack, as these solutions have seen widespread adoption and support by the most successful private-sector consumer and enterprise software technology companies.

In the UK, departments are required by the digital service standard to make all new source code open and reusable, and publish it under appropriate licenses (or give a convincing explanation as to why this can't be done for specific subsets of the source code). Services that fail to conform to the standard will be not hosted on the gov.uk site, the government's "single-window" platform for digital services.

OPENPediatrics, Zooniverse and Global Forest Watch have also harnessed flexible, cloud-based infrastructures to host their services so that computing resources can be provisioned in real time to meet spikes in user demand. While governments will continue to host highly sensitive information



internally, cloud-based hosting services will save money and time and should be pursued where appropriate.

## **Rule #9 Digital leaders make rules conform to modern development practices**

Rather than make their development practices conform to outdated rules, digital leaders update their rules to correspond with modern development practices. Among other things, this work has entailed updating HR policies, modernizing procurement rules, and streamlining governance.

In updating their procurement policies, for example, the UK and the US have eliminated rules that limit the reuse of standardized components and open source, limited the use of long-term service contracts and bolstered the ability of SMEs to bid successfully on government contracts. Reformed procurement processes also mandate good development practices like conducting a research and prototyping phase, refining product requirements as the service is built, ensuring frequent delivery milestones, and allowing the flexibility to purchase cloud computing resources.

“Technology goes in cycles,” says Bracken. “New players come in, some of the older ones adapt and they survive. What we’re looking for is people who can work in the way we want to work. We don’t want a £450m 10-year contract, we want a £250k six-week, let’s-build-a-prototype-and-see-if-it-works type of relationship.” Today, the GDS works with thousands of suppliers, including many SMEs who have been encouraged to contract with the GDS directly, rather than work through large systems integrators.

## **Rule #10 Digital innovation requires a steadfast organizational commitment**

To achieve sustained innovation, organizations need leaders who are passionate, who are not satisfied with the status quo, and who are committed to continuous innovation and continuous improvement. Indeed, the outcomes achieved through digital innovation are generally commensurate with the level of commitment dedicated to maximizing the benefits over the long term.

Each of the digital innovation rules described above required leadership and a strong organizational commitment to bring them to fruition. And not just a one-off commitment, but an ongoing organizational devotion to sustaining the innovation over time. In fact, digital leaders have often established positions of digital authority – often Cabinet level positions – to oversee digital transformation in public service delivery.

In the UK, political leadership from Francis Maude and executive level leadership provided by Mike Bracken (and later Kevin Cunningham) signaled the importance of digital innovation to the broader organization, created a clear accountability structure and established the authority to initiate necessary changes in legislation, bureaucratic processes and organizational structures. In New York City, the digital agenda was initially championed by Mayor Bloomberg and executed by a newly created position of Chief Digital Officer. In most jurisdictions, this combination of an elected official with a high-level executive responsible for overall public service modernization makes the most effective pairing for leading the digital transformation agenda.



However, digital leaders do not deploy the top-down leadership models of old. Indeed, to make headway on digital innovation, public sector executives must create a dynamic meritocracy where ideas and information can flow freely through the organization. This means being genuinely open to new ideas, irrespective of who or where they originate from, instead of jumping at the opportunity to undermine them. It also means encouraging people within the organization to talk and collaborate directly with each other – even if they’re in different ministries or departments.

Digital leaders understand that innovation is not a process or a strategy; it is a culture of efficient problem solving. It is the unexpected, beneficial by-product of an organization that hits the sweet spot between process and lack of process. As Matthew Burton, the former CIO of the Consumer Financial Protection Bureau, put it, “Innovation happens when you insert curious, creative people into an environment full of interesting problems, and you give those people the freedom to pursue their own ideas.”

Ministers and Deputy Ministers, along with other organizational leaders, must, above all, demonstrate and encourage these values in the way they lead their organizations. No matter how inspired, well meaning, or determined others may be, no one else can institutionalize a culture across an organization like the organizational leader—the person who ultimately defines and embodies an organization’s culture.

## 6. Towards Digital Governance: A Challenge to the Public Service

As we step into the future, societies are facing incredible challenges of complexity on a global scale. Sustaining societies and economies in the face of climate change, energy shortages, poverty, demographic shifts, and security will test the ingenuity of those who wish to see, do, and participate in the public good.

In each of these issue areas governments face a reality in which they are increasingly dependent for authority on a network of powers and counter-influences of which they are just a part. Whether streamlining government service delivery or resolving complex issues, governments are either actively seeking — or can no longer resist — broader participation from citizens and a diverse array of other stakeholders. Just as the modern multinational corporation sources ideas, parts and materials from a vast external network of customers, researchers and suppliers, governments must hone their capacity to integrate skills and knowledge from multiple participants to meet expectations for a more responsive, resourceful, efficient and accountable form of governance.

The investments jurisdictions make today in digital government are a necessary part of adapting to this new reality. Done right, these investments will have generous payoffs. Citizens will benefit from more convenient access to modern digital services and from better online engagement with their elected officials. With a few clicks, policy makers will be able to tap the expertise of diverse participants and glean important insights from growing accumulation of open data. Businesses will see dividends in digitally enabled business support programs and in streamlined processes for regulatory approvals. Taxpayers will reap the benefits of greater public sector efficiency due, in turn,



to reductions in manual data processing, less reliance on external vendors and expensive proprietary solutions, and the cost savings from migrating citizens to less costly digital channels.

Digital transformation will yield softer benefits that are no less important. Closing the digital innovation gap with the private sector, for example, will help build public confidence in government. Creating a more innovative, tech-savvy work environment will help the public service attract and retain a highly skilled workforce. A more agile and effective public service also makes jurisdictions more attractive destinations for business investment and the creation of jobs and prosperity.

None of these benefits will materialize, however, without a dramatic change in how governments approach digital innovation. Rather than a patchwork of isolated, non-coordinated approaches to digital, jurisdictions need a bold, integrated and sustainable approach that creates a high-level executive mandate for public service modernization, aligns current efforts across the government, invests in talent, and removes key barriers to enabling digital transformation.

While many jurisdictions have made considerable progress towards digital government, the hard work has only just begun. The first-wave of digitally-enabled “e-government” strategies delivered some important benefits. It made government information and services more accessible to citizens while creating administrative and operational efficiencies. But too many of these initiatives focused on automating existing processes and moving existing government services online.

This next wave of innovation presents an historic occasion to fundamentally redesign how government operates, how and what the public sector provides, and ultimately, how governments interact and engage with their citizens. Governments can and must rise to these challenges. Leaders in policy, HR, legal and communications will all have come to the table to make the digital agenda successful. The public service will need its employees to feel they are on a journey and to keep focused on being a high performing team. It is truly a time when either government plays an active and positive role in its own transformation, or change will happen to it. The transformation process is at the same time exhilarating and painful, but the price of inaction is a lost opportunity for government to redefine its role in society and help launch a new era of digital government.

## ENDNOTES

<sup>1</sup> For a simple example of a lab tool brought into the field see: <http://www.proscopehr.com/law.html>

<sup>2</sup> <http://www.spiegel.de/international/world/santander-a-digital-smart-city-prototype-in-spain-a-888480.html>

<sup>3</sup> Lizette Chapman, “With ‘Warren,’ Kensho is Building a Siri for the Financial Industry,” *Wall Street Journal*, January 23, 2014.

<sup>4</sup> See: <http://www.narrativescience.com/>

<sup>5</sup> Ian Steadman, “IBM’s Watson is better at diagnosing cancer than human doctors.” *Wired Magazine*, February 11, 2013.

<sup>6</sup> Tom Steinberg, Ed Mayo, “Digital Engagement”, *The Power of Information Taskforce* (2007).

<sup>7</sup> Tom Steinberg, Ed Mayo, “Digital Engagement”, *The Power of Information Taskforce* (2007).

<sup>8</sup> “About Us”, [crocodyl.org](http://crocodyl.org) (Accessed May 18, 2013).

<sup>9</sup> One enthusiast built a custom Google search engine that users can use to quickly browse information on a given corporation. Type in a company name and it spits out a list of recent pages, prioritized from a list of websites that focus





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on corporate scrutiny. Hit the “Controversy” link, and one can narrow the results using a list of keywords such as “human rights” “lawsuit,” “labor violation,” “superfund,” and “abuse.”

<sup>10</sup> “CrocTail: making government data useable,” *The CSR Digest* (July 8, 2012).

<sup>11</sup> Wade-Hahn Chan, “4 studies in collaboration; Case 3: Puget Sound Information Challenge”, Federal Computer Week (February 29, 2008)

<sup>12</sup> <http://info.evergreen.ca/en/ecw/projects/urban-future>.

<sup>13</sup> Interview with Geoff Cape, executive director, Evergreen Foundation.

<sup>14</sup> Ibid.

<sup>15</sup> [http://www.inflacionverdadera.com/?page\\_id=362](http://www.inflacionverdadera.com/?page_id=362)

<sup>16</sup> <http://www.nytimes.com/2014/11/21/us/activists-wield-search-data-to-challenge-and-change-police-policy.html>

<sup>17</sup> “User Stories.” OPENPediatrics – Until Every Child Is Well. Web. 2 Jan. 2014.

<sup>18</sup> “Why OPENPediatrics is needed.” *OPENPediatrics – Overview*. 2 Jan 2014. Web video.

<sup>19</sup> Burns, Jeffrey. “OPENPediatrics: scaling beyond the walls of the hospital in a global healthcare world.” *Arab Health Magazine*. April, 2013. 42-23. PDF.

<sup>20</sup> Burns, Jeffrey. “OPENPediatrics: scaling beyond the walls of the hospital in a global healthcare world.” *Arab Health Magazine*. April, 2013. 42-23. PDF.

<sup>21</sup> “About Us.” *OPENPediatrics – Overview*. 2 Jan 2014. Web.

<sup>22</sup> Burns, Jeffrey. “OPENPediatrics: scaling beyond the walls of the hospital in a global healthcare world.” *Arab Health Magazine*. April, 2013. 42-23. PDF.

<sup>23</sup> “3 ways to achieve zero tropical deforestation by 2020.” *WRI Insights*, June 25, 2013.

<http://insights.wri.org/news/2013/06/3-ways-achieve-zero-tropical-deforestation-2020#sthash.AddCtSdK.dpuf>

<sup>24</sup> A project like Galaxy Zoo requires using actual people instead of a computer algorithm, Schawinski explains, because computers aren't very good at pattern recognition. Humans, on the other hand, are exceptionally good at picking out different patterns and shapes, such as being able to distinguish between people's faces at a quick glance, he notes. The same turns out to be true when it comes to distinguishing different types of galaxies.