Digital Service Teams:
Challenges and Recommendations for Government

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IBM Center for
The Business of Government

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Foreword

On behalf of the IBM Center for The Business of Government, we are pleased to present this report, *Digital Service Teams: Challenges and Recommendations for Government*, by Ines Mergel.

This report is timely, as the U.S. federal government develops its approach to infusing proven private sector technology models into government in order to spur job creation and innovation. It will likely start by assessing the effectiveness of the recently adopted model of the creation of digital service teams—which was initially pioneered by the British government in 2011. Understanding the evolution and challenges of creating and sustaining digital service teams in the public sector will provide useful context for future directions.

Daniel J. Chenok

The impetus for the creation and use of digital service teams in the U.S. grew out of the lessons learned from numerous IT implementation challenges in the federal government in recent years. Multiple assessments have found that a high percentage of high-risk federal IT projects were over-budget or behind schedule, with a dearth of IT talent who can respond quickly to ongoing challenges. The creation of digital service teams was a quick turnaround response to attracting top IT talent into government, resulting in a number of "wins" in delivering IT projects in a range of agencies and services.

Susan Wedge

But was the creation of digital service teams a transitory need, or a long-term requirement given the rapid pace of IT innovation that cannot be delivered via traditional government mechanisms? Is there value in creating and sustaining additional digital service teams at the government-wide and agency levels? If so, what are the most appropriate business models and prerequisites for success?
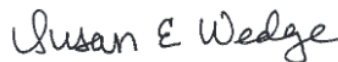
Dr. Mergel provides the necessary context to answering these questions, based on her review of the evolution and use of digital service teams in the U.S. and other countries, and the opportunities they can leverage to scale, sustain, and succeed over time.

Based on her observations and interviews, Dr. Mergel also provides recommendations to digital service teams and policy makers about how digital service teams can have value for public leaders in years to come.

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Executive Summary

Digital service offices have emerged in governments around the world over the past six years as "tech surge teams" to respond to and repair urgent technology failures, or as an alternative structural approach to rethinking processes and implementation strategies in government digital transformation efforts. This report shares insights about three types of digital service teams:

1. *Centralized teams* directly supporting national priorities, such as the U.S. Digital Service, or the United Kingdom's Government Digital Service

2. *Enterprise teams* supporting innovation in IT acquisition and internal consultancy services, such as 18F, an office within the Technology Transformation Service at the General Services Administration (GSA) that states it is a "services company and product incubator" with the goal of providing digital development and consulting services for other federal government agencies or programs

3. *Agency-level teams*, such as those pioneered in the U.S.: the Digital Service at the Department of Veterans Affairs, the Environmental Protection Agency, and the Department of Defense

The insights provided in this report are based on a review of relevant literature and interviews with founding members, current directors, line managers of digital service teams, their counterparts in the offices of the Chief Information Officer (CIO) and Chief Technology Officer (CTO) at the agency level, and private-sector representatives aiming to collaborate with these new teams. The interviews focused on the structure of the teams, the use of agile and human-centered design processes, changes to human resource (HR) processes to attract information technology (IT) talent from the private sector, the incentives for IT professionals to join the U.S. federal government, and the changes made to federal IT acquisition processes.

One of the catalysts that led to the creation of these various digital service units was the inability to deliver an operational HealthCare.gov website on time in late 2013, which was symptomatic of a broader federal challenge in delivering large-scale IT projects. A post-mortem assessment found that the government's existing IT expertise did not reflect private-sector industry practices, and that there was a gap between the needs of program managers and the technical capacity available to implement large projects effectively. A key contributing factor was that over three-quarters of the current IT budget for the federal government is earmarked to maintain existing, outdated legacy IT systems, leaving little room to exploit the potential for adopting innovative, new technology approaches and capacities.

A near-term solution to this lack of technical capacity and innovation skills was the introduction of so-called "IT start-ups" within government, also known as "digital service teams." These small teams typically operate outside existing agency IT organizational structures and recruit IT talent directly from the private sector. They are given a mandate to rapidly implement change initiatives using commercially-developed tools and processes such as human-centered design and agile innovation management techniques—which are standard practice in the private sector, but have been infrequently adopted in the public sector.

The report identifies six challenges that digital service teams face in their efforts to implement digital transformation projects in a government context:

• Embracing an agile development approach

• Attracting IT talent from the private sector

• Maintaining and scaling a start-up culture in government

• Improving the acquisition of innovative IT

• Funding digital service teams

• Addressing whether innovation should be "bought or built"

From these challenges, several recommendations emerge for agencies that are in the process of setting up their own digital service teams, or are considering doing so. These include:

• Understanding that digital transformation in government is not a "software problem," but requires a holistic and strategic approach

• Using "outside-the-box" thinking to infuse innovation into acquisition strategies

• Phasing-in the use of new cost models to support digital services "start-up" teams

• Including non-technical government employees as part of digital services teams

• Challenging perceptions that "innovation can't happen here," given existing regulatory and cultural constraints

• Enlisting facilitative leaders to champion digital transformation

• Promoting greater collaboration among digital service teams and agency IT stakeholders

In addition, the author recommends that policy makers take steps to ensure longer-term sustainability of digital transformation through the use of digital service teams. These steps include:

• Aligning the priority of digital transformation with other mission-driven national and agency-level priorities

• Addressing the legacy IT problems of the federal government

• Scaling up digital service team activities where they demonstrate value

• Expanding agencies' authority to use innovative personnel tools to bring IT talent into government

• Adopting a new approach towards third-party service providers that reduces procedural acquisition burdens in favor of demonstrated capacity to deliver results

Part I: Driving Digital Transformation in the Face of IT Legacy Systems

The evolution towards a digital government over the past three decades has gone through several phases, which have set the stage for some of the structural and institutional problems that the federal government faced in 2009 when President Barack Obama took office. His administration launched an ambitious digital government transformation effort, often using social media and mobile technologies, but without first addressing the existing systemic problems. As a result, it experienced a high profile, troubled launch of the new online market place for health insurance, HealthCare.gov, in 2013.

In a postmortem, federal IT leaders identified several root causes for its implementation problems:

- A lack of in-house IT talent and tech-savvy contract managers

- The reliance on outmoded approaches to program management that have resulted in 94 percent of high-risk projects failing, government-wide

- The fact that much of the government's IT budget was invested in maintaining legacy IT systems, which significantly limited investments in modern IT solutions

In addition, transformational digital strategies were still focused at the project level, and not on broader transformational approaches. Yet, there has been progress. Federal IT leaders at the time recognized that digital transformation cannot occur with an "IT-first" mindset; rather, it requires a more holistic approach. They understood that technology is not the main driver for transformational changes. Their assessment identified six attributes for successful digital transformation: agile development and leadership approaches, attracting IT talent, maintaining and scaling up a start-up culture, change in IT acquisition methods, funding, and decisions whether IT innovations are built in-house or bought from external contractors.

Further, they recognized that a broad, systemic transformation in the federal culture and approach to IT delivery was deemed unlikely in the near term, given the scale of federal operations and limited funding. As a result, the Obama administration undertook a more targeted approach to managing digital transformation—adopting the use of digital service teams—which had been successfully pioneered by the British government in 2011.

An important driver to rethinking government approaches to digital service delivery has been the so-called "legacy IT" problem. This problem is not unique to the U.S. federal government; many other Western democracies face it as well. It stems from the fact that many of these countries began to digitize their operations several decades ago and these systems are now "aging in place." In the U.S., for example, the Government Accountability Office reports that about 75 percent of the federal government's IT budget is spent to maintain and operate existing legacy IT systems (GAO 2016b), some of which are more than 50 years old. As a consequence, less than a quarter of the budget is available to invest in innovative developments, modernizations, and other enhancements. GAO also reports that the portion of the budget available for new IT initiatives has continued to decline over the past decade. At the same time, 94 percent of high-risk IT projects are over budget and behind schedule, with 40 percent never being finished (Torgovnick 2016).

The Need for Digital Transformation, Not Incremental Change

What is missing in the current conversation about moving to a digital government is how these systemic problems need to be tackled beyond the individual project level and that the strategy needs to shift from digitizing existing processes to fundamentally rethinking and transforming business processes.

Emerging digital transformation approaches used in the private technology sector could be adapted and used by governments to improve their operations and services. These common private-sector approaches include:

- The strategic management of innovation processes

- The adoption of user-centric design approaches

- Using cross-institutional and cross-functional teams to implement initiatives (which include software engineers who are allowed to use agile methods, contractors who promise to deliver using agile processes, and most importantly, clients who see the benefits)

In order to adapt these private sector approaches to the public sector, cutting-edge government leaders found that they needed to:

- Rethink existing government acquisition policies and practices

- Initiate institutional changes in their relationships with external contractors

- Change the government's inherent risk-averse culture

- Recognize organizational champions who promote these changes

One forward-leaning federal CTO explains: "We are just embarking on the journey, but for us digital transformation is bringing infrastructure, systems, and software folks together and focus on 'outcomes first,' creating a tremendous change in culture, processes, and oversight. We, as an organizational entity were focused on IT, and now need to learn not to think about it." The CTO adds that this integrative skillset "is largely absent in the federal system."

For some government agencies, this transformative shift occurred in response to external conditions, such as the availability of new technologies or the changing needs of their stakeholders. As another progressive CTO explains: "What we're striving to do is recognizing that technology is changing, not just at a fast clip, but at an accelerating clip. You have to look for things that break past linear incrementalism, because you will fall behind, even if that is what you are doing, because of the exponential change. When we talk about [digital transformation], it is recognizing it is changing practices, IT is definitely a piece of it, but it really is working with the mission stakeholders for how can they can continue to do their mission effectively, and in some cases new missions, in this exponential era."

The common thread across various progressive CTOs is that they recognize that digital transformation cannot happen with an "IT first" approach. For example, one CTO explains: "If you lead with IT as opposed to saying 'Look, this is really about a whole mission change, and it's about us working as partners with the different bureaus and offices,' I think you're gonna have much more success if you lead with the mission approach and the empowering-the-edge approach than leading with the IT approach."

Based on these insights, this report has adopted the following definition of "digital transformation:"

Digital transformation is a holistic effort to rethink and change the core processes of government beyond the traditional digitization efforts in government. It evolves along a continuum from the use of agile methods and changes in IT contracting practices to organizational change efforts that involve the whole ecosystem of the organization.

Based on interviews and case studies, the successful implementation of a digital transformation initiative in federal agencies seems to come down to four elements:

- Relatively independent digital teams

- A commitment to reduce costs in "buy vs. build" decision-making processes

- The use of agile acquisition policies, with buy-in from contractors and congressional appropriators

- The adoption of human-centered design and development approaches, including the use of agile leadership approaches and a commitment to cultural change

The Current Status of Managing Digital Transformation in the Federal Government

A 2015 U.S. GAO report criticizes the IT acquisition process in the U.S. federal government: "Federal investments in information technology (IT) have often resulted in multimillion dollar cost overruns and years-long schedule delays, with questionable mission-related achievements." A case in point is the troubled launch of the online marketplace, HealthCare.gov. The U.S. GAO (2014a) attributes the initial failure of that program's IT platform to mistakes in contract planning and a lack of oversight practices among the responsible IT staff. Subsequently, the Office of Management and Budget (OMB) instructed federal departments and agencies to use part of their IT budgets to set up digital service teams, modeled after the White House's U.S. Digital Service, to improve their service delivery capabilities. This shift in resources towards improving customer-centric service delivery expanded on already-existing mandates for better customer service in Executive Order 13571 (The White House 2011), OMB's implementation instructions (2011), the White House's 2012 Digital Strategy, and the Presidential Memorandum instructing the federal government to work toward 'Building a 21st Century Digital Government' (The White House 2012b).

In 2014, the White House established the U.S. Digital Service (USDS) team and GSA created 18F as a software development team. The so-called 'digital SWAT teams' inside USDS focus mostly on immediate 'fire-fighting' activities, such as the HealthCare.gov troubleshooting efforts, or other high-priority projects, such as the digitization of U.S. Customs and Immigration Service forms which are still paper-based, or the Department of Veterans Affairs' education and health service delivery processes. 18F software engineers respond directly to agency requests and are paired with public servants, with whom they apply agile software development methods to the requested projects. These practices are now being replicated in agency-level digital service teams throughout the U.S. federal government.

In addition, the Presidential Innovation Fellows (PIF) program was created to provide short-term opportunities for private-sector IT experts to work in government. This program was linked to a little-used direct hiring authority that allows short-term "tours of duty" in government. Both of these initiatives are creating opportunities to move external talent from the private sector into government for short periods of time to undertake specific projects and then return to their previous positions.

The new administration has continued to support USDS and 18F. In addition, the White House has focused more broadly on actions to reform government IT, through the establishment of the Office of American Innovation and the American Technology Council. Likewise, Congress has recently moved forward on legislation that would support more agile funding processes and other steps to modernize government IT, with the introduction of the Modernizing Government Technology Act in both the House and the Senate. All of these actions indicate continued momentum for digital transformation in the U.S. government.

The Federal Government's Legacy IT Problem

Why have digital service teams been created in the first place? The recent push for digital transformation teams can be explained, in part, by a GAO report (2016b), in which agencies are urged to address the federal government's aging legacy systems. On average, about 75 percent of federal agencies' IT budgets is spent on maintaining and operating their existing IT infrastructure. This means that there are not enough resources to innovate or digitize existing off-line processes, or replace the old IT systems. As a matter of fact, resources for maintaining legacy IT infrastructure have risen, and the available resources for digital transformation efforts are consistently decreasing.

Figure 1 shows the U.S. GAO's breakdown of federal IT spending, with resources declining by $7.3 billion for development, modernization, and enhancement initiatives between 2010 and 2017:

Figure 1: IT Spending by Year in the U.S. Federal Government (GAO-16-0468)

Source: GAO analysis of agency data. | GAO-16-468
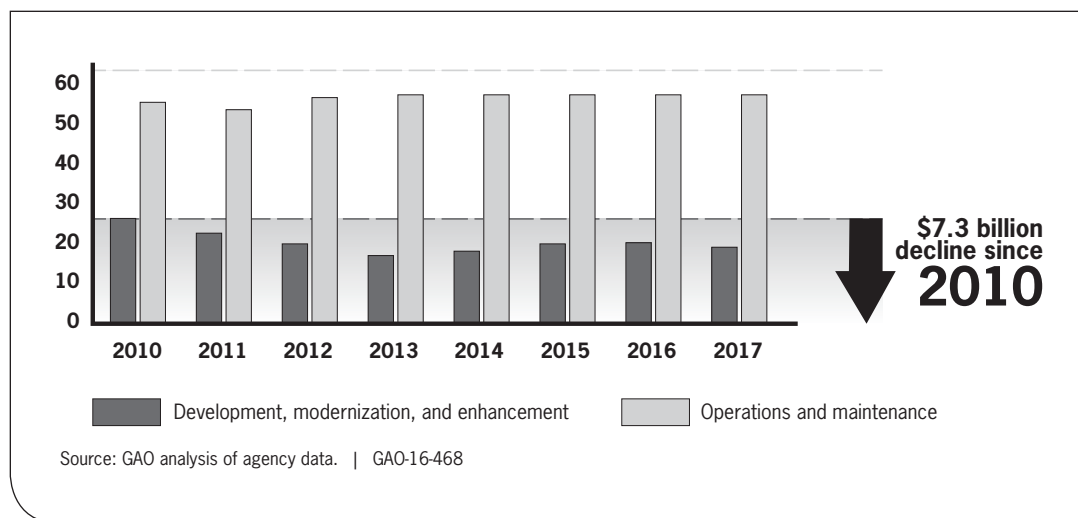
GAO reports that there are several reasons for this trend: rigorous acquisition policies, risk-aversion in veering outside the practiced and proven acquisition and innovation processes, limited internal IT expertise, and a "path-dependency" in IT acquisition (where agencies tend to go back to pre-approved, proven contractors). The results are that IT expertise is too often outsourced to contractors. As a result, the government's requests for proposals are often off-target and lead to follow-up (service) contracts with budget overruns, incomplete delivery, even failure, and long delays in IT service delivery (often exceeding 12 months after the original completion date).

Part II: The Role of Digital Service Teams in Leading Digital Transformation

One of the recent responses to the need for digital transformation and to mitigate IT failures has been the creation of "digital service teams" (also called digital SWAT teams, tech surge teams, digital fix-it shops, or tech trouble-shooting teams). This development is observable around the world and the resulting organization can be divided into three forms:

1. *Centralized teams* directly supporting national priorities, such as The U.S. Digital Service, the UK's Government Digital Service, the Estonian government's Chief Information Officer's role, the Danish Agency for Digitization and the Australian Digital Transformation Agency (DTA)

2. *Enterprise teams* supporting innovation in IT acquisition and internal consultancy services, such as 18F, an office within the Technology Transformation Service at the General Services Administration (GSA), that is called a services company and product incubator with the goal to provide digital development and consulting services for other federal government agencies or programs

3. *Agency-level teams*, such as the Digital Service at the Department of Veterans Affairs (DSVA), the Environmental Protection Agency's Office of Digital Services and Technical Architecture, and the Department of Defense's Digital Service.

Digital Service Teams Around the World

Digital teams have been created in governments across the globe over the past six years. The original idea can be traced back to the **United Kingdom's Government Digital Service (GDS)**, which is part of the Cabinet office and was initially created in 2011 to improve the central website of the British government, GOV.uk. In addition, the team focuses on improving government services by simplifying access, improving (opening) government data, and making government more effective and efficient with the introduction of new technologies—following tech guru Tim O'Reilly's concept of "Government as a Platform" (see sidebar). GDS is advising and challenging the government to make faster progress in getting more citizens and services online. As a platform, government is seen as a wholesaler and as the creator of "a retail shop front for government services and content by mandating the development and opening up of Application Programming Interfaces (APIs) to third parties."

The Concept of "Government as a Platform"

Tech guru Tim O'Reilly's "Government as a Platform" concept defines government as a "convener and enabler rather than the first mover of civic action" (2010:15).

In the context of Open Government, this means that government literally provides 'only' the digital platforms, such as open data platforms, and leaves it up to the ingenuity and creativity of citizens, civil society, the nonprofit and private sectors to create innovative services, such as apps using open government data.

Source: Tim O'Reilly (2010): Government as a Platform, in: Daniel Lathrop and Laurel Ruma (Eds.), Open Government Collaboration, Transparency, and Participation, Sebastopol, CA, O'Reilly Media, p. 16-39.

GDS' goal is to include all government agencies to ensure "government offers digital products and services at least equal to the digital experience delivered by the giants of the web." (GOV.uk). Their digital transformation mission is stated thus: "We are transforming how we work, how we organise ourselves and how we serve our citizens. Our strategy is to deliver at pace and scale; to deliver meaningful change to the people who need it most, faster and more efficiently."[1] GDS' goal is to introduce deep change in the back office in addition to building more functional online services.

The **Australian** government created its **Digital Transformation Agency (DTA)** in 2016. This agency "exists to make it easy for people to deal with government, by helping government transform services to be simple, clear and fast." (See Figure 2.) As Paul Shelter, the former Australian government's chief digital officer, recently described his experiences working for both GDS and DTA: *"An awful lot of the basic ideas on how you fix government IT is [found] by looking at structural reasons for behaviour rather than just saying 'let's make a nicer interface."*

Figure 2: Australian Digital Transformation Agency's Mission

What we do

Australians are more mobile, more connected and more reliant on technology than ever before.

This is why government is working to improve how it delivers services online.

Our agency was set up in 2015 to help government departments and agencies undergo digital transformation.

Since then, our role has grown. We now have wide-ranging responsibilities to help lead transformation across government and have central oversight of the government's ICT agenda.

Our responsibilities include:

- leading the digital transformation of government services
- working in partnership with government agencies to improve how they buy and deliver digital services
- improving the way government buys and uses technology
- using agile methods to deliver and continuously improve services for users
- helping to build digital skills capability across government
- developing products and platforms for government agencies that can be reused
- advising government about digital service delivery and shared platforms
- providing greater transparency to government on ICT projects, costs, risks and opportunities.

Source: Australian Government Digital Transformation Agency website (dta.gov.au)

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1.   For the digital transformation strategy of GDS see: dwpdigital.blog.gov.uk/2017/02/17/dwp-digital-delivering-the-government-transfor-mation-vision/.

DIGITALISERINGSSTYRELSEN

Similarly, **Denmark** created the **Danish Agency for Digitization** in 2011 (see www.digst.dk). The Danish digitalization strategy focuses specifically on expanding its already impressive online offerings (80 percent of all public services are available online) with mandatory digital self-service and digital post, which means that Danish citizens must be equipped to receive government correspondence in digital format. Digital post from public authorities includes letters from hospitals, pension statements, information about student grants, changes in housing benefits, assignment of day-care facilities, or letters from the Central Customs and Tax Administration. An impressive undertaking that aims to include all levels of government and expand their collaboration to the private sector, especially the financial and IT sectors, to create a Danish "digital mindset."

e-Estonia.com
The Digital Society

WEL COME TO EST ONIA

Estonia has given immense strategic planning and implementation authority to a central Chief Information Officer and his team. The country was able to transform from a former USSR-occupied region with no digital government services to the most innovative e-Government country in the world.[2]

Estonia has adopted a "Country as a Service" (CaaS) concept. Its digital services are built on three layers:

- X-Road, a system of registries, which allows governments to share encrypted data across agency boundaries with each other

- An electronic ID for all citizens initiated by the banking industry in the 1990s to certify online transactions

- The online platform eEsti.ee, the Estonian State eService portal

The responsibilities for this holistic approach included private and non-profit sector representatives to work toward digital transformation of the whole country. The budget authority remains with the central CIO, while service authority is distributed across several agencies.

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Other country-level efforts include **Italy's Digital Team** that was launched in 2016 with the mission "to make public services for citizens and business accessible in an easy manner, via a mobile-first approach, with reliable, scalable and fault tolerant architectures, based on clearly defined APIs, support the different central and local government departments in making the best and most data driven decisions, thanks to the adoption of big data and machine learning techniques." (see teamdigitale.governo.it/en). The Italian prime minister has hired Diego Piacentini, a former Apple manager and currently on leave from his position as vice president of Amazon's international consumer business, to lead the digital team's efforts.

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2. Source: teamdigitale.governo.it/en/2-content.htm

The box below shows the charge given to the Italian digital team:

Tasks

- Coordinate the different government and PA [public administration] stakeholders to manage existing and future digital programs in an integrated manner with an agile methodology and an open data approach

- Identify new digital and technology transformation initiatives

- Become one authoritative centre of digital and innovation competence for the different government and PA stakeholders in order to share guidelines, directives and opinions

- Create a community of developers and designers who can contribute to the development of Application Programming Interfaces and digital services; report and solve technological challenges; provide information and training on digital innovation principles and create a shared wealth of tools and services

- Lay a foundation for an evolving architecture that will grow over time and will stay on top of emerging technological trends

Our Manifesto of Technological and Operating Principles

For now, it is a dialogue; then, who knows?

Security and privacy are the most important tenets; the team never makes compromises in this regard:

- We will value existing technological assets; we will not rebuild what already works in the Italian PA and will also be inspired by functional international models

- We will be obsessed with simplification; everything we do will be easy to use for all citizens

- We will think and design with a mobile-first approach

- We will evaluate and leverage open source technologies

- We will follow modern design patterns, including service oriented, fault tolerant, scalable and elastic architecture

- We will be relentlessly data driven; we will apply machine learning and artificial intelligence techniques, whenever necessary to solve complex problems

- We will be open and vocal about our technical innovations, publishing papers that detail what we built, the decisions we took, the mistakes we made and the benefits we saw

- We will lay out a long term vision, but also identify intermediate milestones that allow us to quickly deliver value to Italian citizens

- We will continue learning; we will not limit ourselves to these principles and we will add new ones

Source: teamdigitale.governo.it/en/2-content.htm

Other countries are still in the planning stages to develop similar central teams. **Germany** plans to create a "Digitalagentur" (digital agency) as part of the federal government's Chancellery. The **Government of Canada** has just released its 2017 budget, which includes an intention to create a **Canadian Digital Service (CDS)**, informed by efforts such as 18F and GDS.[3] The CDS will focus on three priority areas:

- High-speed Internet for all Canadians, no matter where they live

- A real opportunity to be part of the digital economy

- An open, transparent and innovative Internet

Canadian Digital Services

The government has an opportunity—and a responsibility—to lead the way when it comes to digital innovation support more widespread adoption of digital tools, and to better serve Canadians.

Informed by similar initiatives in the U.S. (the U.S. Digital Service/18F) and the United Kingdom (the Government Digital Service), the Government will adopt new ways of serving Canadians. Better use of digital technologies could improve the ways in which businesses can access government services, speed up immigration processing times through better-integrated information, or make it easier for Canadians to access benefits or tax information online.

Source: Government of Canada Budget 2017—Building a Strong Middle Class (www.budget.gc.ca/2017/docs/plan/chap-01-en.html#Toc477707371)

The following figure summarizes the development of digital service agencies across the world:

**Figure 3: Timeline of Digital Service Teams**
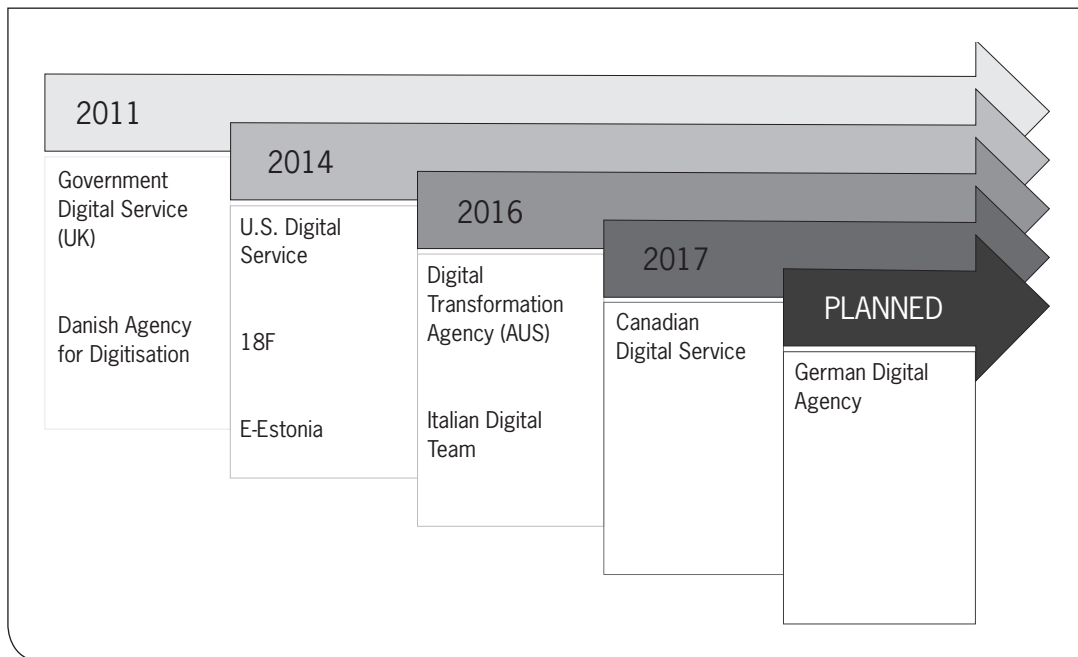
Digital Service Teams in the U.S. Federal Government

In the **United States**, the Obama Administration initiated similar efforts after the 2013 troubled launch of HealthCare.gov, an online marketplace to match citizens with pre-approved health insurance providers in their state. As a 2016 Department of Health and Human Services' (HHS) Inspector General report states: "Most critical was the absence of clear leadership, which caused delays in decision-making and a lack of clarity in project tasks. Additional missteps included devoting too much time to developing policy, which left too little time for developing the website, and failing to properly manage its key website development contract. CMS's [Centers for Medicare & Medicaid Services] organizational structure and culture also hampered progress, including poor coordination between policy and technical work. CMS continued on a failing path despite signs of trouble, making rushed corrections that proved insufficient. Following the launch, CMS and contractors pivoted quickly to corrective action, reorganizing the work to improve execution." (Office of Inspector General 2016).

After the emergency clean-up efforts, the HHS Inspector General report states the website was recovered within two months using "a 'badge-less' culture for the project, wherein all CMS staff and contractors worked together as a team, and a practice of 'ruthless prioritization' that aligned work efforts with the most important and achievable goals."

Stabilizing and Improving HealthCare.gov

The U.S. Digital Service reported to Congress that a team of private-sector engineers and product managers joined CMS's staff and contractors in late 2013 as a 'tech surge team' to identify and solve website operation problems (The U.S. Digital Service 2016). In its report, USDS highlights: "The HealthCare.gov turnaround demonstrated the enormous potential of empowering small teams of America's brightest digital talent to apply modern technology best practices to Federal Government projects." As a result, the White House created USDS to apply similar methods to other high-priority technology problems in the federal government.
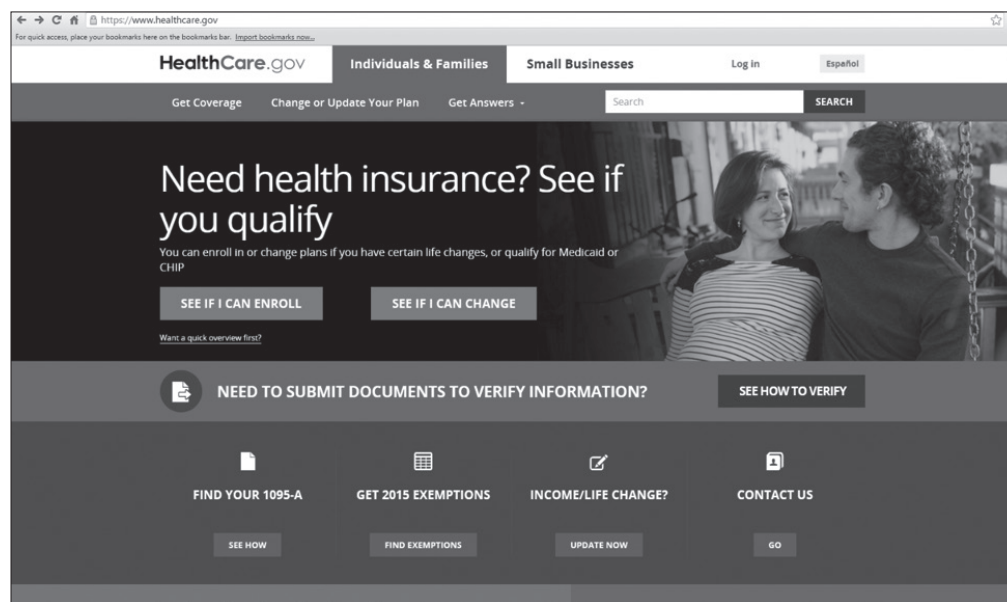
Source: The U.S. Digital Service, Report to Congress (December 2016)

The efforts and success of the digital surge team led to the institutionalization of three different forms of digital service teams in the federal government:

1. *The U.S. Digital Service*, directly associated with the White House and housed in the Office of Management and Budget, focuses on specific technology projects that are determined to be national priorities

2. *18F*, a team of software engineers and product managers embedded at GSA that provides fee-for-service consultancy services to other federal agencies

3. *Agency-level in-house digital service teams* that focus on high priority policy areas within their home agency. The first agency-level digital service was created at the Department of Veterans Affairs, quickly followed by the Environmental Protection Agency's Office of Digital Services and Technical Architecture, and the Department of Defense's Digital Service. These teams are funded through additional congressional appropriations or through reprioritizing existing internal budgetary resources. They are modelled after, and often affiliated and staffed with, former USDS and 18F employees

Part III: The Six Challenges of Creating Digital Service Teams

Challenges occur in these innovative settings on the procedural, organizational, and cultural levels. Many of these teams aim to attract talent from the private sector, specifically from Silicon Valley, and preserve a similar "start-up" culture inside of government. The bureaucracy however often contradicts a "just do it" mentality when it comes to acquisition rules and regulations, hiring, or the compliant use of technology. Outlined below are six major challenges of creating and maintaining digital service teams that might help other teams understand how their efforts can be grasped by the bureaucracy.

Challenge 1: Embracing an Agile Development Approach

Private sector technology-based companies have rapidly embraced the tenets of "agile" software development, which is characterized by a rapid development of functionality that focuses on the needs of the end users, or clients. This approach, however, is seen as antithetical to traditional software development approaches in government and has met some resistance.

A Reluctance to Embrace Agile Development

Internally, government digital service teams are using an agile development approach. The development phases in an agile software development process are shortened to weeks, instead of months or years, and department project managers are involved as clients at every stage not only as a contract partner for the final review. Introducing an innovative software development approach that includes both users and technologists at each stage of the development process, poses opportunities to improve user-centric outcomes, but also challenges risk-averse contractor-centric project management approach established in government. The White House is supporting agile development and the reuse of software developed by other government units through its new open-source policy (The White House 2016).

Definition of the "Agile" Software Development Approach

We are uncovering better ways of developing software by doing it and helping others do it.

Through this work we have come to value:

Individuals and interactions	over	Processes and tools
Working software	over	Comprehensive documentation
Customer collaboration	over	Contract negotiation
Responding to change	over	Following a plan

That is, while there is value in the items on the right, we value the items on the left more.

Source: Manifesto for Agile Software Development (http://agilemanifesto.org/)

One of the interviewees explains the agile approach to human- or client-centered design that the digital service teams are bringing to the table: "[If you are] not taking the time to step back and say it is not just about having shinier, newer IT, but actually working through [the consumer help desk update]. Had we just moved that to a shinier, newer IT platform, I think our stakeholders would have still been pretty irked at the [department]. The real transformation occurred by making it like a Turbo Tax-like approach, where you actually say what is the nature of your concern, and within about 5 or 6 questions you have actually filled out the information that normally would be associated with one of [the previous] 18 forms, but you didn't have to know a priority of which of the forms to fill out. That was a process change, yes, IT was part of it, but it really is thinking about the stakeholder experience first and foremost."

Streamlining VA Disability Claim Processing

USDS worked on streaming the VA disability claim processing IT system that is used to track and process appeals to at the Board of Veterans' Appeals. The system was built on an outdated IT infrastructure and has led to large backlogs in processing (see for example Shane III 2016 in MilitaryTimes.com). USDS established its first agency digital service at VA (DSVA) and developed a new system to track paperless appeals, called Caseflow (The U.S. Digital Service 2016). DSVA also worked on simplifying Veteran-facing services with Vets.gov including online healthcare applications, education benefits, check disability claim status, prescription refills, and secure messaging to health providers.

Caseflow is a new project and we are still working on making it helpful and useful. Have a question, feature improvement, or problem? Send feedback

Caseflow   Login

Welcome to Caseflow!

Caseflow helps you certify an appeal by making sure all documents necessary for certification are in the eFolder. If all documents are accounted for, Caseflow will assist with filling out an electronic Form 8.

Please log in using your VACOLS credentials.

VACOLS Login ID

Example: RO06

VACOLS Password

Login

Built with ♡ by the Digital Service at the VA.   Send feedback

Source: The U.S. Digital Service, Report to Congress (December 2016)

Another important characteristic of an agile development approach is the continuous delivery of functionality to clients (Agile Manifesto, 2001; Martin, 2003). This results in near-real time involvement by the client as part of the development process, and allows for continuous feedback and improvement in all stages of the process. However, this requires an increased time commitment by the client—be it a government agency's representatives or citizens. These agile characteristics shift practices and values: the value is not generated by delivering a final product that fulfills the initial Request for Proposal (RFP) or contract. Instead, value is created by putting the client at the center of the project and delivering a final product that benefits the client and creates value for the public.[4]

Figure 4: Agile Sprints in IT Software Development

Source: Mergel (2016)
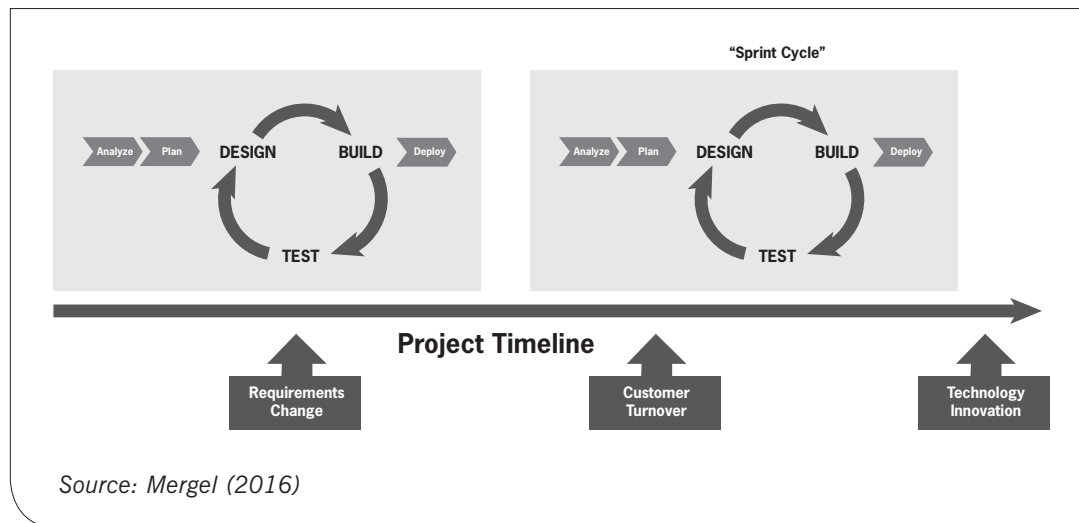
Securing Top Cover by Executive Champions

Executive champions and leadership need to provide top cover for the structural, operational, and managerial changes that are required to transform the organizations and not just change project management (Leybourn 2013). In the best-case scenario, executive champions understand and implement agile approaches top down and can thereby influence the culture of the organization. The interview partners included in this research project are located at the executive level of the organization. They need top cover from the head of the organization for their transformation efforts, and at the same time they provide top cover for their own teams—either embedded in the existing IT departments or as stand-alone 'SWAT teams.'

Referring to cover from the head of the organization one CTO said: "I have top cover in that we continue to deliver. I think that would probably be fair to say that. In any organization, you're only as good as what did you deliver in the last 6 months." Another CTO clearly highlights that as long as the digital transformation efforts stay on track to support the mission and that he prioritizes projects that are of importance to the chairman he sees the current development as a great opportunity to transform the organization.

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4.   See also, Paul Gorans and Philippe Kruchten. "A Guide to Critical Success Factors in Agile Delivery," IBM Center for the Business of Government. http://businessofgovernment.org/report/guide-success-factors-agile-delivery. 2014.

However, top cover is much more important in fulfilling the mission and reaching digital transformation goals. That means executives need to embrace an agile leadership style, which includes encouraging the organization to embrace agile methods, hire and place the right people who inspire others, and serve as change agents for the organization as a whole. Given the current mode of operation in government as one CTO mentions, it will be important to build agile leadership capacity: "in some respects government is doing exactly what it was designed to do. [If] you go back to what the Federalist author James Madison wrote in 1788, he said he wanted ambition to counter ambition. Remember, they had just fought a war against the king back in the 1700s, and so the last thing they wanted was any one person to get too much power. And so the solution was to use people's own ambition to keep in check the ambitions of others. The challenge of course is, in today's world, we need to be agile." In a government environment leadership encouragement is needed to keep the checks and balances in place, while still allowing employees to experiment and "be the flak jacket for the rest of the team." However, the leadership challenge in government is that there are no rewards for experimentation, such as the bonuses that are distributed in the private sector. So one government CTO highlights the positive behavioral changes and outcomes he sees publicly via his Twitter feed, organizes Happy Hours, and distributes tokens of appreciation, such as T-Rex dinosaur statues with which employees are proud to decorate their desks.

Challenge 2: Attracting IT Talent

Making use of flexible hiring policies has become an important cornerstone to build and scale up teams such as 18F or USDS, which are often labelled as start-ups within the government. Top IT talent is recruited mostly from outside the government, including other local and state government agencies, civic hacking teams, NGOs and non-profits, or former contractors. Several high-profile hires hail from technology companies in Silicon Valley such as Google or from the computer animation film studio Pixar, which is where GSA's Technology Transformation Service recruited its associate administrator.

Hiring policies were not changed to make these hires possible, instead existing underutilized policies were activated to make direct hiring possible. One example is the use of the U.S. Office of Personnel Management's direct hiring authority (Schedule A, Subpart R) that grants agencies the authority to hire people on a short-term appointment. This allows teams to bring IT talent into government for term appointments as opposed to unrestricted career positions and a full competitive hiring process.[5] The maximum duration is two years with a possible extension for another two years. According to OPM, direct hiring authority is applicable when there is a "severe-shortage of candidates. Prior to using this authority, the department and agency heads (other than the Secretary of Defense) must determine whether a shortage of highly qualified individuals exists."[6]

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5   For more information about Direct Hiring Authority see: https://www.opm.gov/policy-data-oversight/hiring-information/direct-hire-authority/.
6   See Government-Wide Hire Authority for Information Technology Management esp. Cyber Security: https://www.opm.gov/policy-data-oversight/hiring-information/direct-hire-authority/#url=Governmentwide-Authority.

Another way to leverage outside industry expertise to work within government is the use of the Presidential Innovation Fellows (PIF) program.[7]

Goals of the Presidential Innovation Fellows Program:

- **Recruit the best our nation has to offer:** Fellows include entrepreneurs, startup founders, and innovators with experience at large technology companies and startups, each of whom leverage their proven skills and technical expertise to create huge value for the public.

- **Partner with innovators inside government:** Working as teams, the Presidential Innovation Fellows and their partners across the government create products and services that are responsive, user-friendly, and help to improve the way the Federal government interacts with the American people.

- **Deploy proven private sector strategies:** Fellows leverage best practices from the private sector to deliver better, more effective programs and policies across the Federal government.

- **Focus on some of the Nation's biggest and most pressing challenges:** Projects focus on topics such as improving access to education, fueling job creation and the economy, and expanding the public's ability to access their personal health data.

Source: Press Release—"President Obama Signs Executive Order Making Presidential Innovation Fellows Program Permanent" (www.whitehouse.gov/the-press-office/2015/08/17/ executive-order-presidential-innovation-fellows-program).

The program's goal is to pair talented, diverse technologists and innovators with civil servants and change-makers working in the federal government to work on high-priority projects, as stated on its website: "These teams of entrepreneurs-in-residence and government experts take a user-centric approach to issues at the intersection of people, processes, products, and policy to achieve lasting impact at startup speed." PIF fellows have worked on projects such as the Veterans Affairs' Blue Button initiative to provide electronic access to health records of veterans or the Opportunity Project, an open data project to improve economic mobility. Other fellows are deployed throughout the federal government in rotational assignments to support short-term projects. The PIF program was recently made permanent as part of the Talent Act of 2017.

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7   See https://presidentialinnovationfellows.gov/ for program information.

The TALENT Act of 2017

§3171. Presidential Innovation Fellows Program

- **Policy.** It is in the national interest for the Government to attract the brightest minds skilled in technology or innovative practices to serve in the Government to work on some of the Nation's biggest and most pressing challenges. This subchapter establishes a program to encourage successful entrepreneurs, executives, and innovators to join the Government and work in close cooperation with Government leaders, to create meaningful solutions that can help save lives and taxpayer money, fuel job creation, and significantly improve how the Government serves the American people.

- **Establishment.** The Administrator of General Services shall continue the Presidential Innovation Fellows Program (hereinafter referred to as the 'Program') to enable exceptional individuals with proven track records to serve time-limited appointments in executive agencies to address some of the Nation's most significant challenges and improve existing Government efforts that would particularly benefit from expertise using innovative techniques and technology. "

- **Administration.** The Program shall be administered by a Director, appointed by the Administrator under authorities of the General Services Administration. The Administrator shall provide necessary staff, resources and administrative support for the Program. "

- **Appointment of Fellows.** The Director shall appoint fellows pursuant to the Program and, in cooperation with executive agencies, shall facilitate placement of fellows to participate in projects that have the potential for significant positive effects and are consistent with the President's goals.

Source: Public Law 115-1, 115th Congress

Active Talent Recruitment and Development

Recruitment of future employees with matching IT skills and experience is used as an innovative tool for government. Typically, government jobs are announced on the federal government's employment site, USAJobs.gov, and candidates apply through the website. Sometimes, teams announce jobs via social media to make people aware of available openings.

Officially, active recruiting has not been part of the HR toolbox in the federal government. One of 18F's employees responsible for recruiting points out that "The people that we hire, software developers, product managers, and designers, […] are people that are high in demand. In order to attract these folks, we actually need people, who are recruiters in that space who know the best people, can build relationships with them to get them to be interested in those opportunities, because there are often sacrifices that people make to go into government." They use personal messages, phone calls, and other means of direct outreach to attract representatives of organizations that are likely to have the talent that is needed in government.

Team leaders, founders, and chapter directors point out that they use their own personal connections to get the word out, tell people about the unique team and work environment. They highlight the unique start-up climate in which digital teams are working and try to attract talent by promoting the impact and the magnitude of the task to improve government IT.

Attracting IT Talent to Join Digital Service Teams

Attracting IT talent from high-paying private sector technology jobs has been a long-term problem for the public sector. However, digital service teams in the U.S. federal government were able to attract employees, even though as one of the HR representatives explained: "They are making sacrifices. What really gets people motivated to come work here is that they want to use their talents for good. A lot of these developers, if you think of them sitting in Google or Facebook, they may make a lot a money and have a lot of perks, but at the end of the day, they feel like they are just making people more money, and doing things so that ads can get clicked on more. They want more of a social impact. They want to use their talents for social impact. When they see that this is happening in government, where the impact, the possibility of impact is so huge—you can't beat anything like the mission."

An analysis of the first 171 employees' statements shows why employees join digital service teams (Mergel, Belle, and Nasi 2017). The dominant motive to switch—even if only temporarily—from the private or nonprofit sector to the federal government is of prosocial nature (~70 percent), followed by intrinsic motives (~28 percent), and only 2 percent stated that they were extrinsically motivated to join. Prosocial motives focus on employee satisfaction drawn from a commitment to public interest. One employee mentioned: "I really wanted to give what I could to my country." Another one stated: "So many people talk about government being broken. Why not try and fix it? Especially if given the opportunity to work with this many talented and passionate people." This external orientation is supported by flexible HR instruments such as the short-term tours of duties (between 2-6 months in duration) or the Presidential Innovation Fellows Program (2 years).

Other intrinsic motives focus on enjoyment of conducting a certain task, action, or activity. Employees who are driven by these types of motives stated: "I joined […] to support their mission of transparency and help foster the public's trust in government. I work with technology not readily available at other agencies and serve as an advocate for agile development, encryption, and privacy. I work with the best and brightest folks I've ever met, and I wake every day excited to face new and interesting challenges." Another added: "The magnitude of the challenge drew me to [the digital service team]. Government is foreign to me, and I have loved picking up government parlance and custom via immersion."

Only a minority of employees mentioned that they were driven by extrinsic motives, including rewards such as money, fame, or praise: "I heard Sarah Richards, who was the head of content design at GOV.UK at the time (this must have been around 2013), talk about the work the Government Design Service had been doing to improve government services for citizens. I was blown away by the work they had done and how effective they'd been. I thought, if we ever start something like that here in the U.S., I want to be a part of it."

Overall, the existing digital teams in the U.S. federal government are attracting talent both for their innovative start-up culture, as well as the type and magnitude of the task they are aiming to accomplish. Former White House CTO Todd Park spent the last years of his tenure with the Obama Administration largely focused on recruiting top tech talent into government. One interview partner described the incentives to join government from a high-paying private sector job as follows: "What I loved about 18F and the movement, which includes the U.S. Digital Service at the White House too, is that they are really disrupting: They are disrupting through tech. I really think that the technological infrastructure is crumbling, just like our physical infrastructure is. There are data breaches. It is very difficult for people on the outside to get access to the services they need, and in some cases, government is the lifeline for people. It doesn't make sense that we have the technology available, like I can from my phone order a warm gluten-free meal, have it delivered to my house in 10 minutes, but a veteran can't get the services they need, or a working family. When I saw that there was an organization that was really making strides in addressing those problems, I wanted to be a part of that."

There are more traditional, formal incentives that government can provide to digital service employees as well. These include: One-time year-end bonuses, two-week leave policies, teleworking opportunities for remote work three days per week even in cities with government offices, technology equipment and software production environments that are on par with the private sector, inflation raises, health insurance, and promotions.

Challenge 3: Maintaining and Scaling a Start-Up Culture in Government

The most challenging aspect of digital transformation is the notion that the internal bureaucratic culture of government has to dramatically change and existing processes have to be redesigned to fit the changing needs of citizens. Culture does not refer to standard operating procedures, but the notion of 'how we do things around here.' The internal digital service teams sometimes work in a vacuum and are protected from the top to push forward on high priority projects outside the existing IT teams or the larger ecosystem of the organizations and are therefore carefully observed by the rest of the organization (Ravindranath 2016). In some cases, in which existing teams are expanded by hiring new talent or trying to integrate PIFs, the change has been described as "very uncomfortable and very negative."

"Some of our folks say [the bureaucracy] can sometimes be soul crushing. You just want to bang your head against the wall. When that happens, you have to go back to why you joined, and think about 'I'm on the inside. Think of the users on the outside who actually need this to live.' That gets you repurposed, and recommitted."

The College Scorecard

A team comprised of 18F and USDS members worked together with the Department of Education to launch the College Scorecard to help students and their families make more informed college or other school choices (The U.S. Digital Service 2016). The scorecard provides data on college costs, graduation rates, graduate debt, repayment rates, and post-college earnings. The teams worked with students, families, and their advisers to provide national data and metrics.
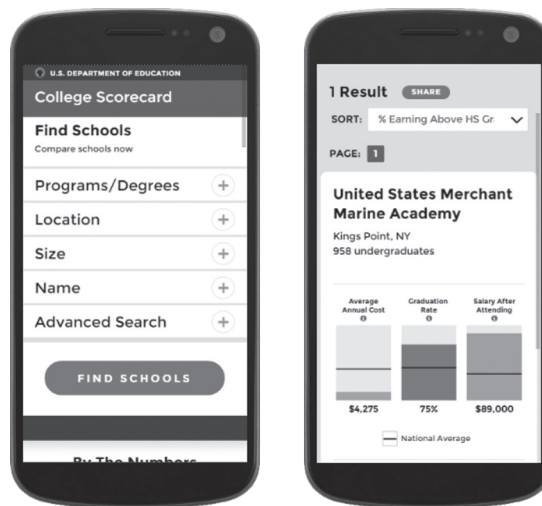
Source: The U.S. Digital Service, Report to Congress (December 2016)

As one director of one of the digital service teams notes about the steep learning curve of private-sector software engineers: "What they need to know about government is that it is slow to change and that you can't come in thinking you are going to make a big sweeping change. You are moving the ball down the line, and incremental change is as important and is in fact what sticks. There is deep progress in small changes. Large bureaucracies are known for moving slowly."

One of the interview partners for this report explains how difficult the change aspect is in government: "We have 700 lawyers out of the around 17-18,000 folks here at [the department]. Not only are people averse to change, but lawyers are very averse to change. So, to see the vision through and to stay motivated with what we're trying to accomplish, you really do have to believe in the change that you're trying to make happen."

In the agencies involved in this study, digital transformation happens as a result of a shift in how technology and technology operations are viewed. IT is no longer seen as something that happens to the organization and the organization has to adapt to it. Instead, IT is seen as "a tool in the toolkit," but often the real transformation occurs when you change the method and the process by which you do things.

Tensions occur when adoption of new technologies for groupware solutions seemingly happen by GSA's compliance standards. However, GSA has a recent and active history of using for example the social coding platform GitHub to upload and share open-source code[8]. And, as a means to share and collaborate on software code, it allows agencies to use the federally-compatible team communication app Slack (U.S. General Services Administration's Office of Inspector General 2016; Snow and Kunin 2016).[9]

After some central teams as well as agency-level teams have gained experience working in a start-up culture environment and made first experiences pushing the boundaries of innovation in the public sector, what are the next necessary steps? It becomes clear from the interviews as well as the press coverage, that there is a substantial amount of enthusiasm for innovating government operations and upgrading to industry IT standards. However, the few teams that exist are what one interview partner called "a drop in the bucket." A single Defense Department IT project can sometimes include 200 or more programmers, which could equal or exceed the size of the total 18F staff. It is therefore necessary, with a standard promoted from the top, to shift and add resources to scale up the successful change efforts to all federal agencies.

Given the internal tensions discussed elsewhere in this report that have emerged as digital service teams have evolved, it is also necessary to promote a culture of collaboration among digital service teams and CIOs, as well as among IT and program staffs across the agency. This should enhance the understanding of and support for scaling the innovative start-up activities of digital service teams into the broader environment of agency IT programs that drive back-office efficiency and mission delivery.

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8   See GSA Blogpost "Facts about publishing open source code in government" gsablogs.gsa.gov/gsablog/2016/12/30/facts-about-publishing-open-source-code-in-government-2/
9   See Apps.gov Slack page including federally compatible Terms of Service: apps.gov/products/Slack/

Challenge 4: Improving IT Acquisition Results by Using Agile and Open Methods

Several GAO reports point to major IT acquisition problems in the U.S. federal government (U.S. GAO 2011, 2015). For example, a 2011 report highlighted that "federal IT projects too frequently incur cost overruns and schedule slippages while contributing little to mission-related outcomes." Solutions do exist. Two novel strategies that have been successfully adopted in the private sector are to: (1) apply agile methods—initially created to improve the development of software—to the acquisition process, and (2) adopt an "open by default" approach to project management. But to be successful with these fundamental changes to the traditional government IT acquisition approach, the government's contractors have to agree to buy in to using these strategies.

Applying Agile Methods to IT Acquisition

An important procedural change is the push to use agile development practices to run software development projects. As mentioned earlier, agile methods focus on (mostly non-technical) users' needs, instead of government contract managers' assumptions about their stakeholders' needs. Agile methods have a long established history in the private sector (Mergel 2016; Rigby, Sutherland, and Takeuchi 2016), but have not been broadly embraced in the public sector. The majority of project teams are still using "waterfall development" processes, which require finishing one project step before moving on to the next, without allowing a back-and-forth or experimentation to reach the best possible outcome.

Agile Blanket Purchase Agreements (BPAs)

The Agile Delivery Services BPA (Agile BPA) uses blanket purchase agreements featuring private sector technology providers of specialized services. This transformative approach enables the federal government to build and buy digital services in short agile sprints of four weeks from solicitation to contract kick-off:

Source: 18F's Agile BPA Website (pages.18f.gov/ads-bpa/)

Changing practices is however both a legal ('stick to the contract') as well as a cultural challenge. Government officials' standard operating procedure is to follow the acquisitions rules and not change contracts after the fact. They have no incentive to experiment within the framework of existing contracts or change contracting practices without top-down approval. In order to break through these institutional as well as cultural restrictions, the U.S. federal government has created so-called agile blanket purchasing agreements (agile BPAs) in agreement with the Federal Acquisition Regulation (FAR) 8.405-3 (U.S. GSA 2016). As a result, government agencies can now include agile methods (for example, development sprints) in their requests for proposals and select only those contractors who are willing to follow the same approach.

One interview partner explained how agile BPAs are superior to the traditional requests for proposals, especially when it comes to software development projects: "The idea was that government contracts in general are written with what is called an RFP [Request for Proposal]. They're pretty awful. They're awful in part because software is very hard to specify in advance. Even if you are a genius, there is no way you can design an iPhone app and write it as a document and have it make sense. Whereas, a bridge is a much simpler thing. Engineers can professionally design a bridge and expect it to stand up. So what 18F has done with Agile BPAs is revolutionary, because they essentially had a competition where firms are required to produce a prototype. They have to produce a prototype in an open GitHub repository, so that everybody can see it. It more or less was evaluated on the quality of the prototype." These new contracting procedures help government contract managers understand that contractors are truly able to 1) deliver, but 2) also deliver in a format that is required by the agencies now.

At the agency level, as of this writing, only one organization has changed internal acquisition policies and followed up the agile BPA approach with its own internal adjustments. Other agencies are in early stages and are participating in GSA's agile BPA acquisition suggestions. One CTO highlights: "We haven't changed policies right now. We have the written approval to work within the 'spirit of the policy' that we can try [new acquisition procedures] with the five [digital transformation] pilot programs."

Introducing an "Open-by-Default" Approach

Digital service teams work 'in the open' by default. That means "We're committed to working in the open, building accessible products, and deploying early and often." The commitment to open-by-default is operationalized by explaining "what we do, why we do it, how we do it to each other, but most importantly with the public and to show their practices to other government organizations." In turn, it also means that software development from vendors must also be open source, so that if one vendor leaves the federal government, another can pick up and continue the work. One acquisition specialist explains: "[With a] service contract on closed sources you end up being essentially stuck with the same vendor, whereas if everything you are doing is in the open, then any vendor can pick up that code base and run with it. So open source is not just about transparency. It is about the principle of openness, but it is also about helping agencies avoid vendor lock-in that is costly and can result in subpar long-term maintenance."

To the outside, open-by-default means that digital service teams are doing a lot of outreach to government agencies to spread agile acquisition and development methods, evangelize about open source, and help them realize policy changes, as an 18F official notes: "We have created a team that has done a good job of documenting best practices and creating artifacts, both for ourselves. There have been things that we can turn out to the broader community, to the rest of government, or to the private sector if they choose to use it. So you know we've created a lot of guides, [which are available on] 18f.gov. The team has created a bunch of different artifacts and free books and guides about how we work and, and why we work the way that we do."

Replicating these best practices developed once is one of the preconditions that will allow the federal government to transform from within. An important example for all interview partners were GSA's agile acquisition practices. New practices had to be learned and then institutionalized, but beyond new policies, government employees had to learn how to articulate these changed requirements to private sector providers: "We have another unit that specifically helps with digital acquisitions, and that includes helping agencies acquire modern digital service team vendors; vendors who will build things for them the same way that 18F would build for them, that is using agile and working in the open and putting users first and so on."

The U.S. federal government has only recently published an open source policy (The White House OMB 2016), so practices and experiences with open source software are fairly new to departments and agencies. The goal is to develop software once, make it consistently available to other agencies for reuse, and to the broader community to improve the source code. A few prominent examples of tools and websites created with open-source software and shared code include the White House's "We the People" platform, and the Department of Education's "College Scorecard." Once the digital service teams have developed software, they make it available for free to all government agencies via the version control and social coding website Github (Mergel 2015). They use free and open-source software (FOSS), which is free from licensing fees and in turn all source code is published on the social coding platform Github (18F 2016).

The advantage of open contracts is that the federal government avoids "closed contracting," in which the source code is usually property of private-sector providers who then have the leverage to demand follow-up contracts or service contracts. As a result, "you end up being essentially stuck with the same vendor, whereas if you are doing it in the open, then any vendor can pick up that code base and run with it. Open source is not just about transparency and the principal of openness, but it's also about helping agencies avoid vendor lock-in that is costly and can result in subpar long term maintenance." However, the cultural barrier of secrecy and information protection needs to be overcome and agencies participating in open source need to constantly evangelize, as one CTO notes: "It's okay to make something open source, unless there's a good reason not to."

Overcoming the Lack of Buy-In from Government Contractors

A recent congressional hearing showed concerns by federal contractors with the implementation of digital services in government. (House Subcommittee on Government Operations and Subcommittee on Information Technology 2016). One of the interview partners provided insights on why contractors might oppose project management and development approaches that are superior to their current practices: "I think a lot of the vendors that currently do government work have their public sector teams siloed off to the side, doing things the way the government has always done them. But the rest of their business is more modern, it is agile, and it is user-centered and things like that. But they have really kind of walled up their public sector keys in a lot of cases."

Contractors need to understand that government is actively working on changing internal culture and that these cultural changes will be supported by policy changes. As one interview partner notes: "What we heard from many, many vendors is that they're tremendously excited that we're essentially starting to change the culture, change the practices, change the expectations inside the federal government so that they are going be able to work the same way the rest of their team does."

Challenge 5: Funding Digital Service Teams

In many instances, practices can only be changed by hiring additional skills and capabilities from the outside because they are often not readily available inside government. While existing personnel authorities to hire Presidential Innovation Fellows (PIF) for short tours-of-duty in government can temporarily increase competencies, as soon as PIFs leave government and return to their previous positions in the private sector, their knowledge and resources are lost (The White House 2015a). Instead, it is necessary to include long-term congressional appropriations in the federal budget for each department to help them address the IT legacy problems by investing in cloud computing or other types of shared services. Currently, the main part of the IT budget is used for legacy systems, which leaves newly founded digital service teams with ad hoc appropriations from Congress or the necessity to carve out money from the existing budgets to address some of the most urgent IT problems. What is needed are long-term plans and budgets to increase hiring and spending capacity.

The Need for Longer-Term Fiscal Commitments

More important than short-term solutions are long-term fiscal commitments from Congress to give agencies an opportunity to strategically hire the human capital needed in the long-term. The current distribution of congressional appropriations, however, do not reflect executive branch budget requests to meet agency-determined priorities. For example, the fiscal year 2016 budget proposed funding for digital service teams in 25 agencies to hire or designate an executive for managing their digital service teams (U.S. GAO 2016a). As Mark Schwartz, Chief Information Officer of the U.S. Citizenship and Immigration Services publicly stated, it is important for the government to "Buy competent teams, rather than buying a product." (Read 2016). However, only a few agencies received such an appropriation.

At one end of the spectrum, government agencies that asked for additional appropriations did not receive additional budget and had to shift their own budgets to hire IT talent with agile methodology skills out of the base of their operations. Others who did receive a formal appropriation—in form of a commitment to change practices—had to officially cut parts of their budget and rearrange internal budgets to receive additional funding in order to hire a handful of software engineers with the right skills.

At the other end of the spectrum, especially in the intelligence and national security area, one department Chief Technology Officer received an additional budget to put together a team of 25 high-profile IT professionals with a tech and start-up background. But even with the comparatively high level of appropriations, this agency said that digital transformation was not systematically achieved and the CTO feels that a whole ecosystem approach is needed: "We need to change how we hire: we need an internal re-adjustment of funds and not a large [one-time] chunk of money from Congress."

Challenge 6: Addressing Whether Innovation Should Be Bought or Built

A 2016 House Committee on Oversight and Government Reform hearing revealed that some representatives of private-sector providers of technology services to the government have many concerns about the role in-house digital service teams can play when it comes to innovation in government (U.S. Congress 2016). They even went so far to posing the question "Why do we have 18F and USDS?"

This raises the larger questions about how digital transformation may evolve in the federal government:

- Where should innovation of government services and processes come from?

- Is government capable of innovating, or should government focus on the delivery of services only?

- Is the private sector the only source where innovation can occur and can then be moved into government?

These questions are challenging the current status and potential future support of digital service teams. Additional questions and concerns from industry are reflected in the perspective quoted in the box that follows.

An Outside Contractor's Perspective of Federal Digital Service Teams

"There's no question the last administration was very much about encouraging innovation. But I think there were [three] issues with the way they approached it that created problems.

First, they approached it [with a perspective] that innovation does not exist within the beltway in Washington D.C. That if you want innovation, you have got to go out to Silicon Valley, or some of these other technology hubs, hire people who are under 30, who don't wear ties, who are changing the world. And while there's no question there's a lot of innovation out there, I think that did a disservice to companies that are, and government agencies that can't be, innovative. The first step was rather than trying to tap what existed within the community already, they said we have to go outside and bring it in.

The second thing, and this was interesting, I heard this from a lot of the senior government executives, they really liked the idea that there [were] new ideas being brought in. But the way 18F in particular and to a lesser extent USDS, but 18F which is where the age is, there was a sense of first of all, it's great you're bringing in all these people, but let's point out that you're basically freeing them from a lot of the acquisition rules and the employment rules that the rest of us have to live by. So you're creating an artificial environment. So there was a little bit of jealousy, jealousy may be the wrong word. It was sort of like 'if you're willing to, untie the rules, we could do a lot more also.' [And another] thing I heard a little bit of, picked up a little bit of rumbling [about, was that] '18F's really nice; it's taken on the low hanging fruit in a lot of instances.' [However,] they are not exactly tackling legacy system modernization, or any of the really big issues that are confronting the government.

And the third issue that I heard was, it's great that you're doing this, but it's the difference between feeding a hungry person and teaching that person how to farm for themselves. You're not creating an institutional capability in the agencies that can survive and be sustained over time. I think that's where [...] is our attempt to create that institutional capability and encourage it."

Quote from a private sector representative.

Some of the innovation barriers from the viewpoint of those organizations that are representing the IT industry point to the many structural barriers that impede innovation coming from within government. One of those barriers is the sheer size of the federal government and the magnitude of change that is necessary to solve the most pressing problems, such as cybersecurity or legacy IT. A representative of the private sector points out: "If you look at the number of projects that 18F and its precursors could undertake, and the number of projects that USDS can help agencies with, and you look at the thousands of major IT investments in the portfolios of the federal agencies, and you look at how much of that technology is obsolete, how, the legacy issue, how much of it is insecure, then 18F and USDS are great programs, but they can only effect a small percentage of the total IT investment portfolio of the U.S. Government agencies." He offers a potential solution: existing institutes and programs outside of government can take over for digital service teams and scale up their efforts to the whole federal government.

However, one of the founders of one of the digital service teams explains the difference between external contractors and internal digital service teams: "The primary way that we're different is that we're in government too, and our interest is in helping the agency do a great job fast, at a good price, so that we can finish and get out and help [to] set up another agency or help another office with their agency." And he continues to explain the role digital service teams can play in the interactions between agencies buying IT from private sector providers: "We're not there to replace vendors. We're there to help agencies do a better job with vendors to be better buyers of those vendor services. [...] Our interest of course is in helping them find a long-term solution [which will] in most cases involve helping them find a vendor who can maintain and just do the work, and serve it."

In contrast to the "buy vs. build" controversy in the U.S., successful holistic digital transformation efforts in countries like Estonia were realized hand-in-hand with the private sector. Government included nonprofits and academic representatives, such as the e-Government Academy, but also private sector companies into the reform process. The main initiative and funding to create a national digital ID with the underlying data exchange platform and necessary cybersecurity measures came from the banking industry. The IT infrastructure is almost solely built outside of government. As Taavi Kotka, former CIO of Estonia, states: "We don't have any software engineers in government."

While these buy vs. build decisions might on the surface be more easily addressed in a small country like Estonia, the key take-away is: If digital service teams want to innovate government technology and especially for public-facing services, they need to consider different facets and look beyond their internal focus of changing the bureaucracy. They need to conduct a self-assessment by asking questions such as:

- How can they scale their solutions to the whole government?

- How much additional manpower is needed to scale up?

- Who can help them with this task?

- How can they create synergies with other private sector digital developments (e.g. use a digital ID to register to vote, banking, health services, taxes, etc.)?

- How can they integrate service a) across government silos, and b) with private sector services?

Figure 5 shows a possible framework for addressing the controversy: Instead of dismissing the innovative potential of the private sector and limiting "extreme innovation" to digital service teams, the middle ground might be the initial approach 18F and USDS promoted: Change needs to occur inside and outside of government. Private sector providers too often are constrained due to acquisition rules and contracts to step outside the requested requirements and 'follow in line' with government's traditional expectations. Improving innovativeness should not be limited to IT capacity. Instead as one digital service team member said: "As long as we continue to treat digital as just a computer problem, as just something for the CIOs, your progress is going to be limited to that realm."

Instead, new organizational, structural, and process approaches that digital service teams can bring to government can help foster the growth of an innovation culture in government, which will in turn have an impact on how they interact with private sector providers. This might lead to an innovation approach that does not favor one locus of innovation. Instead, innovation occurs *with* government and the private sector service provider.

Figure 5: A Framework for Addressing Public-Private Roles in Government Innovation

Public sector   **Private sector**

**Innovating
in Government**

**Innovating
for Government**

**Innovating
with Government
for the People**
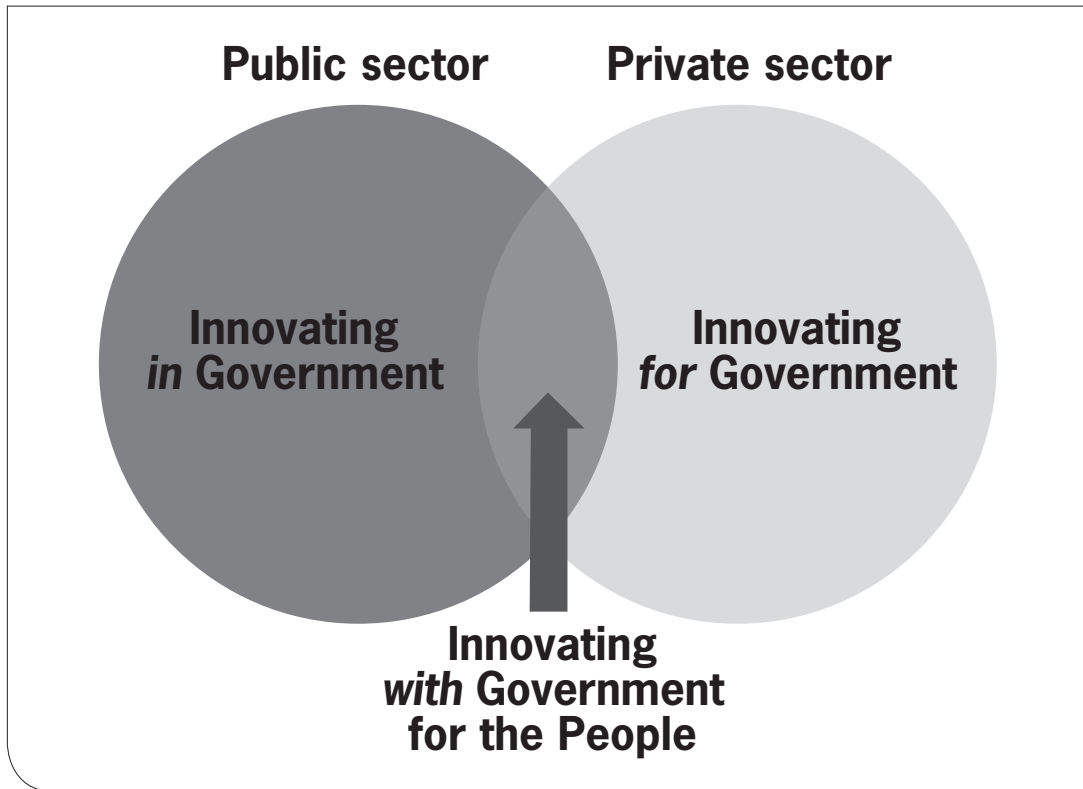
Part IV: Conclusions and Recommendations

Digital transformation is a holistic approach to rethink and change the core processes of government organizations, beyond the traditional digitization efforts undertaken in the past. This new approach requires cultural, managerial, process, and developmental changes by the organization as a whole. Based on interviews with public servants involved in digital transformation efforts in the U.S. federal government, this report identifies a set of common challenges that face them as they tackle major IT problems. As seen in Part III, these challenges are mainly cultural, not technical, in nature. On the one hand, the challenge to innovate inside government is difficult, given the restrictive acquisition and hiring systems. On the other hand, the private sector expects to serve as the primary service provider and innovator when it comes to government technology problem solving.

Based on interviews and case studies, the author concludes that successful digital transformation is dependent on systemic changes beyond the scope of CTOs and CIOs—such as personnel and acquisition policy changes—to encourage activities that support the ultimate outcome: transformation. An important shift in the notion of how digital government efforts were viewed in the past is that digitally-supported transformation needs to move away from restrictive government acquisition approaches, such as relying on close-ended contracts with follow-up service contracts. It is therefore impossible at this stage to identify whether a centralized approach alone is the way forward, or if the combination of centralized, enterprise, and agency-level digital service teams are the more successful implementation option.

In addition, working in the open by default will encourage a larger group of stakeholders to champion digital government innovations and engage other agencies. For example, working in the open could lead to the engagement of a wide community of software developers who can then help improve services once code has been created and is openly shared on social coding platforms. However, efforts to engage a wider community in transformation efforts cannot be limited to software engineers. It is important to actively engage non-technical leaders in the use of agile leadership methods and empower the entire organization, including contract managers, internal clients, and external clients, to engage in human-centered design efforts using agile methods.

Based on interviews and case studies in the United States and other countries, the following recommendations are made for digital service teams and policy makers. For the most part, these recommendations focus more on the need for a different mindset than specific actions.

Recommendations for Digital Service Teams

Recommendation 1. Understand that digital transformation is not a software problem.
Digital transformation in government is a holistic, strategic approach. As a consequence, digital service teams—and especially Presidential Innovation Fellows—need to be more strategic and focus on higher level public administration problems, instead of leaving the impression that they are in government to develop software. External innovators, such as digital service team members, should be given the opportunity to challenge existing traditional administrative processes and focus on achieving outcomes alongside those responsible for delivering public services.

Recommendation 2. Think "outside the box" to infuse innovation into traditional acquisition strategies and tools. Too often, private sector technology contractors supporting government projects have deferred to government bureaucracy and have even created teams that operate outside their other consulting business units in order to accommodate government procedures and standards. This limits opportunities for innovation, even though they are private sector providers. Innovative acquisition instruments, such as agile Blanket Purchase Agreements, the use of open-source requirements, and adopting citizen-centric design approaches, need to be incorporated into contracts by government leaders who do not constrain themselves to using existing bureaucratic self-defined red tape. Likewise, front-line government employees need to be empowered to ask the hard questions. Allow them to push back whenever a fellow bureaucrat says: "This is not allowed in government," or "We have never done it this way."

Recommendation 3. Phase-in the use of new cost models to support digital service "start- up" teams. The procedural and cultural changes digital service teams intend to bring to government need to either be affordable or free for other agencies at the beginning. Otherwise their buy-in and wide-spread adoption will lag behind. This is especially true for those agencies that did not receive funding or congressional authority to build their own internal digital service teams. These agencies are not able to hire the skills from the outside during a time of budget cuts and need to tap into their existing program budgets to free up resources. However, 18F offers to work with agencies and team them up with their own internal consulting teams to create learning experiences at the agency level as a way to move the organization forward. In order to do this successfully, though, 18F and the agencies will have to introduce a graduated fee, step-by-step, to bring in revenue over time rather than achieve full cost recovery and be self-supporting from the start.

Recommendation 4. Include non-technical agency-level employees as part of digital service teams. Recruit non-technical employees to be team members who have deep subject matter expertise about government administrative processes and train them using your tools and technologies to show the risks and opportunities. Most of the challenges of digital transformation are not software problems, but process problems that have evolved organically over time and need to be addressed between IT professionals and savvy public servants.

Recommendation 5. Challenge the traditional view of "We are not allowed to do this."
Often, it is sufficient to ask those who are reluctant to join the efforts and block development and innovation by hiding behind rules and regulations by inviting them to: "Show me the law." Ask where in the law or which regulations prevent public servants from taking a risk and operate outside the existing norms.

Recommendation 6. Enlist facilitative leaders to champion digital transformation. Public managers can only be facilitative leaders if they know the tools, participated in agile design processes, and have therefore taken the same risks as their employees who are asked to embrace them now.

Recommendation 7: Promote greater collaboration among digital service teams and agency IT stakeholders. Establish a culture of shared purpose in modernizing IT based on best commercial practice brought by commercial technology experts, working with CIOs and IT and program officials to scale and integrate those practices. Establish clear and mutually supported roles and responsibilities, and shared incentives for positive outcomes.

Recommendations for Policy Makers

Recommendation 8. Align the priority of digital transformation with other national and agency-level priorities. Digital transformation needs to be given the same level of attention as other policy priorities, since it will be a key enabler for the implementation of those priorities.

Recommendation 9. The President should ask Congress for the resources needed to enable executive branch agencies to replace their frail legacy IT systems with cloud computing and shared services. The current IT problems cannot be solved with the current ad hoc and highly selective "drops in the bucket" approach to addressing the emergency needs of agencies on a case-by-case basis.

Recommendation 10. Increase the use of innovative personnel authorities to bring in IT talent from the private or nonprofit sectors for short-term assignments to infuse government with the necessary innovations. Government can't act like Silicon Valley companies with their "anything-goes" world; however, citizens still expect the same level of seamless online interaction with government as they do in their business or leisure use of the Internet. Talent from outside government is needed to increase creativity in service delivery.

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Appendix: Research Design

This study was informed by an initial review of the computer science literature to derive the core concept of agile software development and to contrast it with traditional development methods. This distinction drawn in the literature as well as in government policies, guidance documents, and reports was then used to inform a semi-structured interview outline for government officials in the U.S. federal government (Drever 1995). The interview partners included top managers of the central U.S. digital transformation team and 18F located in the General Services Administration (GSA) responsible for replicating practices across the federal government and representatives, as well as representatives of five different federal departments in the U.S. government which have already started to apply Agile innovation management approaches. In addition, two more interviews were added to include the private sector perspective beyond what was already documented in a 2016 congressional digital oversight hearing.[10] The selection includes one case only—the U.S. federal government— mainly because the case is well-documented by government technology media articles, but also because each agency faces similar contextual opportunities and constraints (Strauss and Corbin 1998). Other governments, such as the United Kingdom, Estonia, Australia, or the Netherlands have had similar experiences, and more research is needed to understand each case in depth. The interviews, document search and tracing, as well as the existing literature were then used to draw initial conclusions about the concept of agile innovation management.

Interview partners were selected in a snowball sampling approach (Biernacki and Waldorf 1981): this approach allows the researcher to extract knowledge and insights about "people who share or know of others who possess some characteristics that are of research interest" (p. 141). The starting point for the inquiry were the three founding members of GSA's 18F team. Additional 18F members were then selected by the Executive Director. Using his introductions allowed the interviewer to follow the knowledge streams available in the organization and to identify those members with the deepest organizational knowledge and longest tenure in the organization. The business unit leads are early members of 18F and over time had occupied several different positions helping to build 18F in the form of a start-up organization inside of the government. Hailing from private sector technology organizations, such as Twitter, Facebook, Google, and others, they gained experience working in the restricted, bureaucratic environment of government, and were influential in the current organizational design. Many of them were the architects of the business units they were leading at the time of the interviews. In addition, agency-level digital service teams were selected. The contacts emerged either because of their frequent press coverage or because they were mentioned in interviews with previous subjects.

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10   U.S. House of Representatives, Committee on Oversight and Government Reform, Subcommittee on Government Operations and Subcommittee on Information Technology. 2016. "18F and U.S. Digital Service Oversight," https://oversight.house.gov/hearing/18f-and-u-s-digital-service-oversight/.

The two different groups were chosen to compare and contrast the mainstream paradigm that is currently developed at the General Service Administration with the actual 'on the ground' experiences of agencies and the unique challenges they are facing as well as the needs they see for their own context (Noy 2008). In addition to the in-group knowledge that is shared with the interview partner, this approach also helped identify inter-group knowledge, that is knowledge that interview partners were volunteering about others' approaches to digital transformation.

The data was analyzed using a grounded theory-like approach (Strauss and Corbin 1998): with little knowledge about the internal strategic and operational discussions, the author set out to create an initial list of questions to explore the status of the planning and implementation of digital transformation projects in the U.S. federal government. Blog posts, government technology news articles, and roundtable discussions were used to create the initial list of questions, which were tested with three founders of 18F. After each interview, additional questions were formulated, others dropped, or made more specific. For each organization, the list of questions was adapted to reflect the publicly available background information gathered about their digital transformation teams. The interviews were recorded with the permission of the interviewees, transcribed, and then hand-coded line-by-line. The analytical approach for this paper was to identify differences in strategies, context, and implementation phases, instead of looking for common themes. This approach was chosen to understand how a unified top-down strategy is actually implemented at the diverse U.S. federal agencies.

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Professor Dr. Ines Mergel is full Professor of Public Administration at the University of Konstanz, Germany. Professor Mergel teaches courses on managing digital innovation in the public sector, introduction to public administration, and networked governance. Her research interest focuses on managerial and technological innovations in the public sector that make government organizations more effective and efficient.

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