

IBM Center for The Business of Government

# Adopting Agile in State and Local Governments

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# FOREWORD

**On behalf of the IBM Center for The Business of Government, we are pleased to publish this new report, *Adopting Agile in State and Local Governments*, by Sukumar Ganapati, Florida International University.**

Agile emerged initially as a set of values and principles for software development, first formalized with the “Agile Manifesto” in 2001. For two decades, Agile approaches helped revolutionize software development. Today, Agile strategies have been adapted to government services beyond software development, offering new ways of thinking and delivering in areas such as project management, policymaking, human resources, and procurement.

The basics of Agile and associated methods have been addressed in previous IBM Center for The Business of Government reports, which provide a good overview of Agile principles, use of “Lean,” and application of user-centered design. These basics and a more recent report on Agile Government provide insights into the evolution of Agile adoption in public sector over the last two decades.

This new report by Professor Ganapati examines the adoption of Agile among state and local governments. State and local agencies have increasingly adopted Agile methods in the last decade, applying them across a range of applications. At the same time, agencies vary widely in their maturity levels for adoption and implementation.

Professor Ganapati identifies three broad phases in this lifecycle of Agile maturity among public agencies. The three phases do not have distinctive breaks between them. Rather, they fall along a continuum, as public agencies evolve through the lifecycle of implementing Agile. The report highlights the evolution of Agile in the cases of four governments—two states (Connecticut and California) and two cities (New York and Austin). The cases show the rich contextual evolution of Agile, and how the methods support using technology to streamline enterprise processes and address social policy problems. The case studies show different trajectories of adopting Agile in state and local governments—strategies for adopting and implementing Agile methods vary in the three lifecycle phases of infancy, adolescence, and adulthood. The case studies offer lessons for enabling strategies to adopt Agile across these three phases.



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As Professor Ganapati's research underscores, Agile does not present a panacea of preset tools of practices. Agile involves a mindset of organizational change. As a process of continuous improvement, Agile methods themselves can mature over time with doing, testing, and improvement.

This report complements other work we are doing in expanding the use and application of Agile methods to changing the way government operates such as our collaboration with the Agile Government Center (AGC), a new initiative through the National Academy of Public Administration that has as its mission the promotion of Agile practices across government agencies. The report also joins a host of other IBM Center report focusing on Agile techniques and how they can help improve government. Prior studies on this topic include: [The Road to Agile Government: Driving Change to Achieve Success](#), [A Guide to Critical Success Factors in Agile Delivery](#), [Agile Problem Solving in Government: A Case Study of The Opportunity Project](#), and [Transforming How Government Operates: Four Methods of Change](#).

We hope that the cases studies, insights, and recommended strategies outlined in this report will help government agencies in their efforts to adopt and implement Agile methods, taking advantage of evolving capabilities that can enhance public management, ensure better outcomes, and improve public trust in the delivery and operations of government at all levels.

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# EXECUTIVE SUMMARY

**Agile values and principles provide a framework for organizations to be nimble and responsive to changing situations.**



Over the last two decades, the Agile framework has been extended from software development to areas such as project management, policymaking, human resources, and procurement. Steve Denning (2019), an Agile thought leader, calls Agile “a Copernican revolution in management.” This report examines the adoption of Agile among state and local governments.

Three broad waves of Agile adoption can be identified in the last two decades. The first wave (2001-2007) was marked by software development practices (such as use of XP, Scrum, and others), but also saw Agile’s application for manufacturing. In the second wave (2008-2014), Agile was linked with project management and process improvements, including integration with Lean practices. The third wave (from 2015 onwards) is marked by an emphasis on continuous development and integration (e.g., DevOps, which is a combination of development and operations) and the growth of user-centered design (UCD). Contemporary Agile approaches draw seamlessly on Scrum, Lean, Kanban, Lean Startup, UCD, and DevOps. State and local government agencies employ Agile across a range of use cases, including project management, human resource management, acquisitions (i.e., contracting and procurement), and policymaking.

This report highlights the evolution of Agile in the cases of four governments—two state (Connecticut and California) and two local cities (New York and Austin). The cases show the rich contextual evolution of Agile and how the methods are applied for using technology to streamline enterprise processes and to address social policy problems.

- **Connecticut** has had a long history of Lean, based on which the LeanCT program was implemented in 2013. The state instituted the Connecticut Digital Services in 2019 to focus on customer experience, Agile procurement, and modernizing talent and technology platforms.
- **California** implemented the Project Management Office in 2016 to implement standardized management frameworks, including Agile. It passed legislation for setting up the Office of Digital Innovation (ODI) in 2019 to focus on user-centric delivery of state services.
- **New York City** was among one of the early cities to institute the Service Design Studio in 2017, whose mission is to make public services more accessible to New Yorkers through UCD. Their activities are mainly oriented toward assisting low-income residents with benefits and alleviating poverty.
- **Austin, Texas**, began the Office of Innovation in 2014. The office helped in starting the Design, Technology and Innovation Fellows (DTI Fellows) program in 2016, which became the Office of Design and Delivery (ODD) in 2018. The innovation office and ODD have implemented UCD projects to address a range of social problems, including issues faced by the homeless.

Analysis of the four cases shows that there are three broad phases of Agile adoption. In the first phase of *infancy*, when agencies transition from waterfall to Agile, they have little capacity in Agile methods. In the second *adolescent* stage, agencies have some experience with Agile, but most projects are still waterfall. Agile methods may not be fully instituted into the organization's culture. In the third *adult* phase, agencies would be mature in having an Agile organizational culture, where Agile methods are used seamlessly. However, Agile is not an end in itself, but a method of continuous learning and improvement. The case studies offer lessons for enabling strategies to adopt Agile across the three phases.

## Enabling Strategies for Phase I (Infancy)

- **Start Simple with a Small Project.** When a public agency is transitioning to Agile, simple and small-scale pilot projects give an opportunity for the Agile teams to experiment with the methods. The cumulation of successful experiences provide future directions for implementing Agile. Successes increase faith in the Agile methods about their prospects for resource efficiency, timeliness, and end-user satisfaction.
- **Catalyze Cross-Functional Agile Teams.** Kickstarting Agile in the beginning requires leadership to catalyze, support, and protect cross-functional teams. The catalyst can span across departmental siloes to bring together relevant experiences. The Agile teams need support with adequate training and resources. The leader should protect the teams' time from outside organizational influences.

## Enabling Strategies for Phase 2 (Adolescence)

- **Institutionalize Agile Acquisition Procedures.** Institutionalizing the acquisition (contracting and procurement) procedures for Agile enables it to become a routine organizational endeavor, rather than an exception. A project management office (alternatively, the innovation office or the digital services office) could provide the requisite support for Agile acquisition. There are several contractual models that can be adapted for Agile acquisition, such as blanket purchasing agreement, modular contracting, work order authorization, and invitation to negotiate.

- **Cultivate Agile Community of Practice.** Cultivating an Agile community of practice extends the learning process from within the team to the enterprise-wide context to verify the methods that work. The community of practice extends the peer support system and fosters an ecology of Agile environment in the organization. The impetus for setting up the community of practice could come from the top-level leadership (CxO suite), the project management or equivalent office, or from the voluntary efforts of the Agile practitioners themselves.

## Enabling Strategies for Phase 3 (Adult)

- **Establish Agile Management Support.** Support structures for Agile management provide the institutional, technical, and contractual assistance for Agile projects. The institutional support systems help in routinizing Agile procedures. The technical support enhances organizational capacity for Agile. The contractual assistance enables public agencies to work with vendors in iterative and incremental ways. Although these support structures could be established in any phase of Agile adoption, they are critical for maturing the Agile methods enterprise-wide. The support structures could be of different forms, such as project management office, center of excellence, innovation office, and digital services office.
- **Sustain Agile Organizational Culture.** Agile is not an end in itself, but a means toward different ends. Sustaining an Agile organizational culture requires considering Agile itself as being Agile. The central emphasis is on Agile as a mindset where the methods can be flexibly adapted. There are four dimensions of sustainability: leadership, legislative, institutional, and financial support. Leaders support and protect Agile teams. Legislative measures provide the legal backing for agencies to pursue Agile methods. Institutional structures provide the necessary procedural and contractual support for conducting Agile projects. Stable financial support helps in the persistence of institutional structures to sustain Agile methods across the government.



# INTRODUCTION

**Agile emerged initially as a set of values and principles for software development, which were formalized with the Agile Manifesto in 2001.**



The principles have since been expanded to apply beyond software development by public agencies. Agile methods are adopted by the information technology departments, procurement agencies, business process units, and project management offices. These departments in state and local government agencies are at different levels of adopting and implementing Agile. The National Association of State Chief Information Officers (NASCIO) has undertaken several initiatives for promoting Agile in state governments. According to NASCIO's survey, the share of CIOs who reported widespread use of Agile increased from 30 percent in 2015 to 56 percent in 2020 (NASCIO 2020a).

Agile implementation has been one of the top ten priorities for state governments' chief information officers (CIOs) during the past few years (NASCIO 2015; 2016; 2017). The state CIOs have expressly stated a need for "more training on project management, Agile design, user-centered design, etc." among their top ten training needs (NASCIO 2020b). Although there is no similar survey of local governments, anecdotal evidence does show that many cities and counties have begun to adopt Agile and related user-centric methods. The Project Management Institute began to offer an Agile Certified Practitioner (PMI-ACP) credentialing program in 2012. Nonprofits (e.g., Agile Government Leadership, U.S. Digital Response) and private consulting agencies (e.g., Accenture, Deloitte) have also been instrumental in helping state and local governments to transform their digital services, often using Agile methods.

**Why should state and local government agencies consider adopting Agile?** There are at least four prospective reasons for public agencies to adopt Agile.

1. **The traditional waterfall management approach has had a high rate of failure**—in context of software development projects—in both public and private sectors, due to cost overruns, time overruns, or not completing the projects satisfactorily. Large IT projects using Agile are likely to be twice as successful and one-third less likely to fail than waterfall projects (Johnson 2018). Agile methods have higher degree of efficiency, stakeholder satisfaction, and perception of overall project performance (Serrador and Pinto 2015), while also improving project delivery times (Budzier and Flyvbjerg 2013). According to NASCIO's (2020b) survey, the CIOs' view of Agile as a superior approach than waterfall increased from 22 percent in 2015 to 47 percent in 2020.
2. **Agile is particularly relevant in the rapidly evolving digital era.** The digital era is marked by its fast pace of changing requirements and disruptive technologies that create new challenges and opportunities. Agile offers a way for the public agencies to be nimble in adapting to the technological changes. Agile is an incremental and iterative development framework, which emphasizes frequent product delivery. Government digital services could be transformed using Agile methods.
3. **Agile can be used for increasing efficiency in public management.** Agile is often employed for business process improvements underlying public service delivery. Internal organizational management processes and external public facing services can be streamlined using Agile methods. Public services like permitting or licensing, for example, can be delivered more efficiently and effectively. Agile is applied to a wide set of areas such as project management, human resources, financial management, and procurement.
4. **Agile marks a cultural shift in management from a siloed bureaucracy to an entrepreneurial bureaucracy** with an eye to fulfilling the holistic mission of the organization. It is an enterprise-wide culture of continuous learning, seeking to improve value for the public while reducing wasteful practices. Agile is a mindset oriented toward innovation and creative problem solving across different areas.

# Evolution of Agile



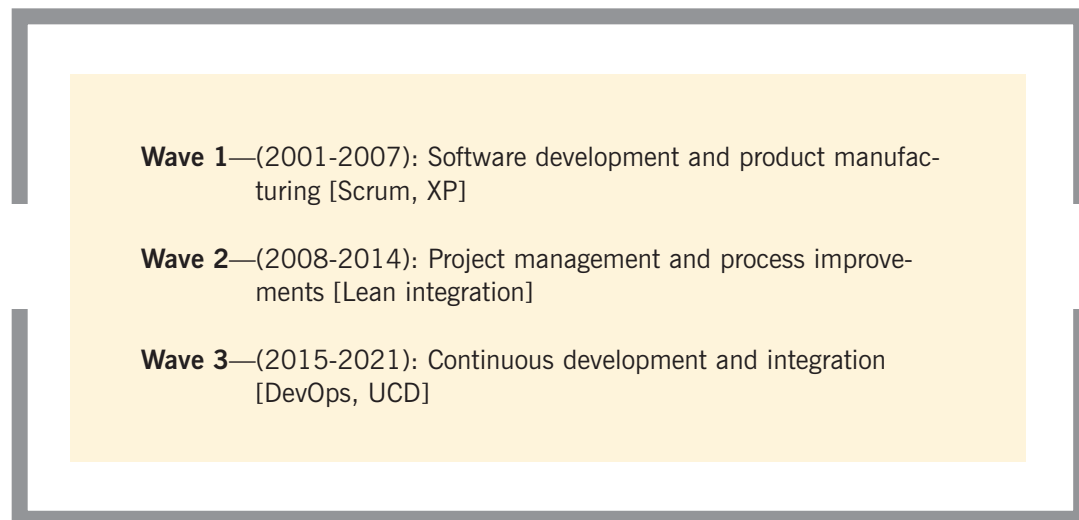
The basics of Agile and associated methods have been covered in previous IBM Center for The Business of Government reports. These reports provide a good overview of Agile principles, use of Lean, and application of user-centered design.

- Maleyeff's (2007) report focused on Lean Six Sigma and examined how it is deployed and implemented application in the public sector.
- Fruhling and Tarrell (2008) focused on use of Agile in the Department of Defense's information systems, and outlined the best practices for initial startup, project implementation, and ongoing development.
- Gorans and Kruchten (2014) identified ten success factors for implementing Agile, which emphasized changes in acquisition process, need for champions and appropriate staffing, and communications, among others.
- Whitford's (2020) report focused on four methods (Agile, Lean, Lean Startup, and Design Thinking) and identified the challenges of adopting them in public agencies.
- Lastly, DeSeve (2020) identified the Agile government principles, which are an extension of the values and principles of the Agile Manifesto formulated in 2001. The ten principles are related to: mission, metrics for success, customer-driven behavior, external networks, speed, cross functional teams, innovation, persistence, evidence informed solutions, and organizational leaders.

The emphasis of the above reports provides insights into the evolution of Agile adoption in public sector over the last two decades. The reports show how Agile methods have transcended beyond implementation for software development in information technology departments and have more generally become principles for government. As Agile approaches expand their domain of application, they have begun to impact the basic organizational management culture. In this context, it is useful to consider the trajectory of evolution of Agile in the last two decades.

### Three Waves of Agile Adoption, 2001-2020

Agile methods have evolved significantly in three broad waves (Jalali and Wohlin 2012; Rodríguez et al. 2019; Vallon, et al. 2018).



**First wave (2001-2007)** was mainly marked by using Agile for software development practices and saw Agile's application for manufacturing. Agile brought together a set of lightweight software development methods included Scrum, eXtreme Programming (XP), and others. Agile also drew on other movements in manufacturing processes, including Lean, Six Sigma, and Kanban. In turn, Agile methods have been applied in traditional industrial firms for innovative projects and flexible management (Conforto et al. 2014).

As Agile adoption increased enterprise-wide, organizations began to scale up Agile methods beyond face to face operations. Although software development still forms a core part of Agile, interest in doctrinaire approaches (e.g., XP) have decline and flexible approaches (e.g., Scrum) gained popularity. As per digital.ai's (2020) annual *State of Agile Survey*, XP's use reduced from 23 percent in 2007 to about 1 percent in 2019; Scrum increased from 40 percent to 58 percent.

**Second wave (2008-2014)** of Agile was linked with project management and process improvements. Efforts to combine Agile with Lean, which were already underway, gained more traction with Agile adopters as it focused on transforming the entire organization (Poppendieck and Poppendieck 2003). Lean allowed scaling up of Agile enterprise-wide and to view software improvement from a broader perspective. The Lean practices were used for continuous process improvement in Agile, especially with Kanban (Wang, Conboy, and Cawley 2012).

Lean Startup further melded Lean with Agile to espouse an entrepreneurial *startup* spirit with an innovation mindset (Blank 2013). The Lean Startup hinged on entrepreneurs mapping their hypotheses, testing them by building a minimally viable product, getting customer feedback, and then using Agile methods to produce the product iteratively and incrementally. It emphasized the managerial dimension of entrepreneurship with a "build-measure-learn" cycle of innovation (Ries 2011; 2017).

Nearly twenty states and many additional city and county governments adopted Lean methods explicitly to reduce waste. Lean methods especially benefitted governments in context of the 2008 economic recession, in which revenues were significantly affected and public agencies had to do more with less.

**Third wave (from 2015 onwards)** is marked by an emphasis on continuous development and integration. DevOps, which is a portmanteau of dev(elopment) and op(eration)s, gained much credence in this wave. Kanban became a popular technique for workflow management, increasing from 6 percent in 2008 to 63 percent in 2019, according to digital.ai's (2020) survey. Contemporary Agile approaches draw on XP, Scrum, Lean, Kanban, and DevOps. Agile also embraces a hybrid combination of these methods, such as Scrum and XP (Scrum/XP), Scrum and Kanban (Scrumban), and other custom combinations. According to the digital.ai (2020) survey, about 27 percent use these hybrid methods.

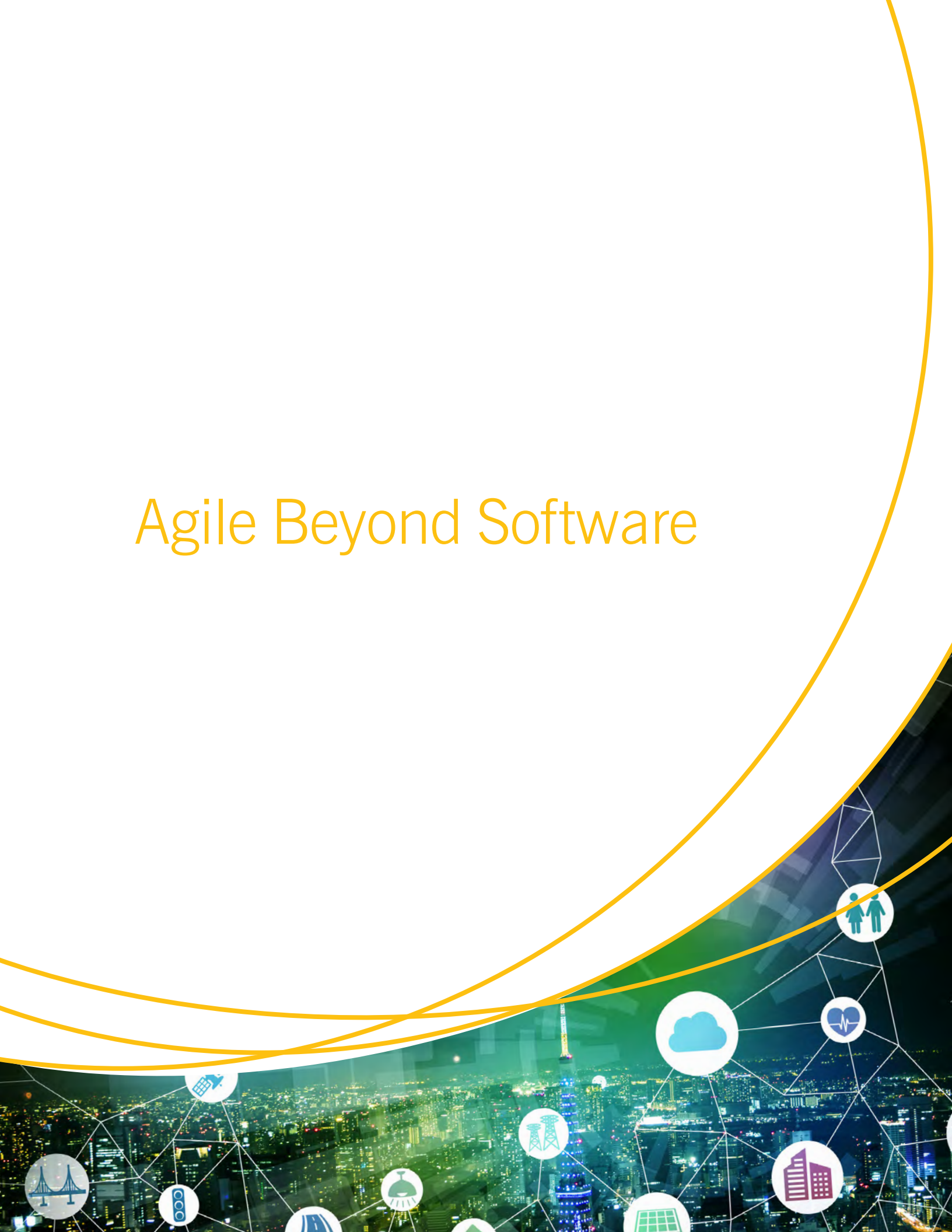
## Recent Developments

Recent developments in Agile have also been accompanied by complementary developments in Design Thinking and low-code platforms.

**Design Thinking** is the process of ideation for innovative ways of delivering government services. The User Centered Design (UCD)—also often called human-centered design—is a problem-solving process by observing or involving end-users directly. It integrates user needs in the development process and aims to better the user experience (UX) of service delivery. Although there are many approaches to Design Thinking (Adikari, McDonald and Campbell 2013), they generally follow stepwise methods. Typically, the steps include: discovering user problem through observations, ideating for identifying various solutions, prototyping experimental solutions, and then testing them before rolling out a solution that enhances user experience.

**Low-code platforms** facilitate modular development of software with minimal hand-coding (Richardson and Rymer 2014). New applications are assembled from pre-developed software modules, which can be assembled visually by dragging, dropping, and connecting. The assembly requires minimal level of coding knowledge for creating the application. Since they are usually intuitive, these nontechnical personnel can also participate in the code development process. Specialized area managers (e.g. from human resource, payroll and accounting, utilities, and others) can direct their own app development. The code simplification saves time and money and increase efficiency (Coleman 2020). The IT departments can then focus on core areas of cybersecurity, device management, and development of the core software modules.

# Agile Beyond Software



Although the above Agile practices have their roots in software development, Agile approaches have been adapted to government services beyond software development. Steve Denning (2019), a thought leader of Agile, claims, “It is truly a Copernican revolution in management.” State and local governments have adapted Agile for their service delivery and process improvements. Agile approaches are used for project management, human resources, acquisitions (i.e., contracting and procurement), and policymaking.

## Agile Project Management

Agile project management extends Agile methods from software development projects to general project management. In this, the Project Management Institute’s *Agile Practice Guide* (2017) distinguished between predictive (waterfall) and complex, uncertain projects. It highlighted the use of Agile for complex projects—these projects entail changes, waste, and rework, which increase costs and time. Agile iterative and incremental approaches reduce waste and rework in these projects because of frequent feedback loops, readaptation of process, updates, and delivery.

The PMI’s practice guide recognized that not all projects require Agile; they may include hybrid models which span predictive and Agile models. Agile teams are cross-functional made up of generalizing specialists (who have a focus specialty *and* experience across multiple skills). A crucial aspect of the guide is the project manager’s role as a servant leader, in order to manage coordination and facilitate collaboration within teams and between teams. While the project manager is usually a team leader in waterfall projects, the person is a facilitator (e.g., scrum master or Agile coach) in Agile projects. Some state and local governments have adopted Agile project management practices through newly established innovation or civic service design offices.

## Agile Human Resource Management

The Agile approach is transforming recruitment, retention, and management of human resources across organizations. Unlike the traditional bureaucratic view of the human resources department as an executioner or the merit-based view of the department as a moderator, the Agile approach views the department as a business partner that is aligned with the organization’s mission (Denning 2018). Agile human resource practices promote collaboration and teamwork (Cappelli and Tavis 2018).

Spotify exemplifies an Agile human resource practice. It is organized in small groups of *tribes*, *squads*, and *chapters*. Chapters are domain experts, who are distributed across teams of squads. Squads are cross-functional teams of nine or fewer people, charged with meeting a user need; the squad could disband after completion of task or move on to another one. Tribes are groups of squads working in the same domain. The organizational structure is thus horizontal where people could move across teams. Recruitment is made by cross-functional teams in an Agile way, where the team monitors the process using Kanban. Managers and supervisors are given training in coaching skills to enable collaboration, working in teams, and employee engagement.

The teams have flexibility to undertake frontline decisions and operate independently. They are loosely coupled, but tightly aligned with balance between autonomy and alignment with organizational mission (Mankins and Garton 2017). Performance management is team oriented and conducted frequently, rather than measuring individual performance annually. Although the incentive systems in government are not as flexible as private systems, public agencies have been innovative in using Agile recruitment practices and having motivated employees who are oriented toward problem solving and making a social impact on the community.



## Agile Acquisitions

Agile acquisition processes are significant for sustaining Agile methods in the organization. Traditional waterfall methods specify all aspects of a contract in detail. For example, the contract specifies time duration, resources allocated, and the performance requirements to be met. The relationship between the public agency and vendor is dictated by the terms of the contract. Agile procurement is oriented toward solving end-user problems, so that the contractual relationship is outcome oriented.

The contracts outline a statement of objectives rather than specific items of work. Large contracts are broken up into smaller *modular* contracts with more frequent interactions. The contractual parameters are flexible and evolve with each module and constant interaction. The public agency and vendor are thus bound in a negotiable relationship. The agency can benefit from latest technological and environmental developments, rather than being contractually committed to outdated needs.

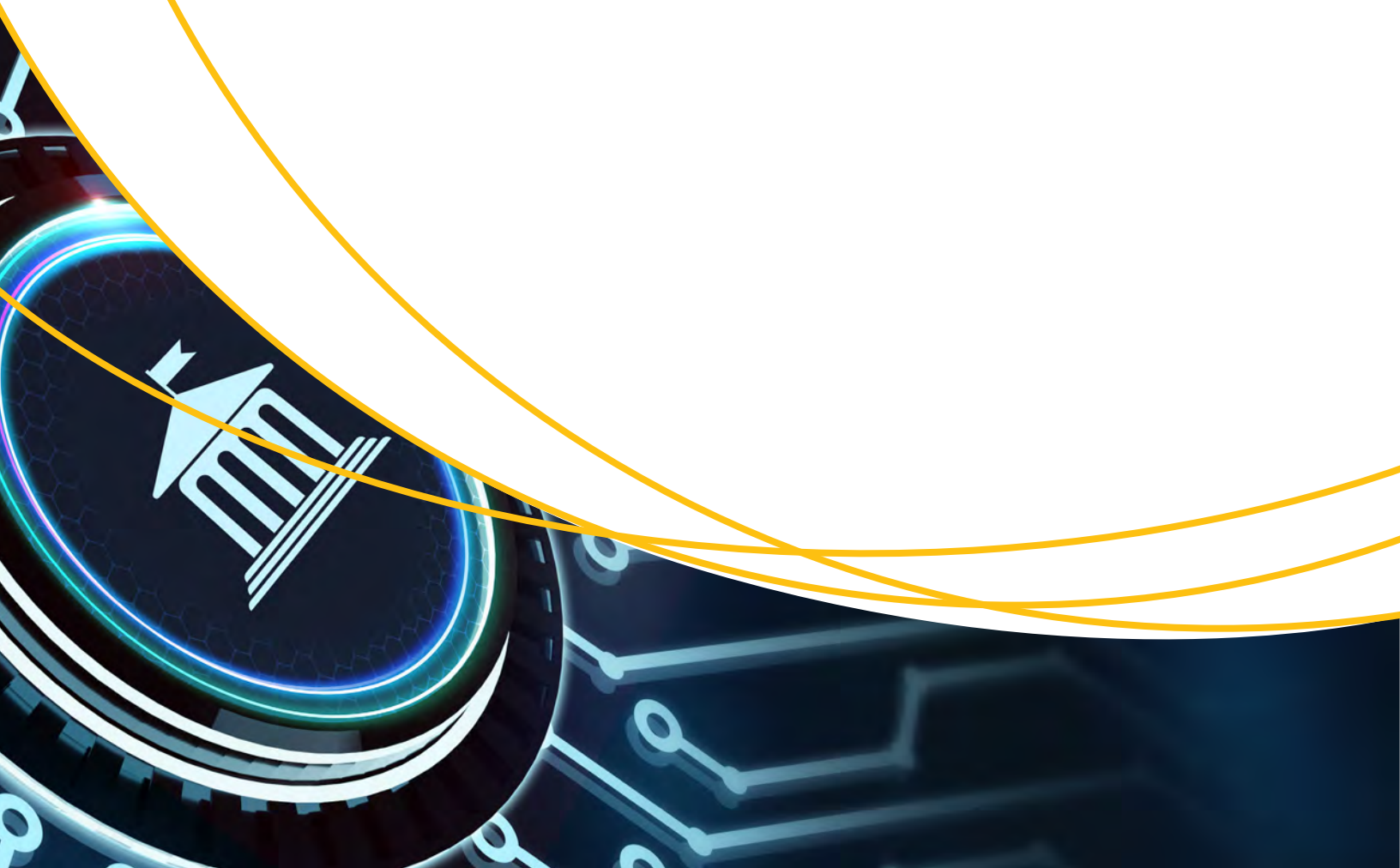
Agile is more suitable in the rapidly evolving digital world where the contractual requirements are complex, uncertain, and evolve over time. To enable Agile acquisition, state and local governments have been training procurement officers in Agile methods (e.g., scrum) (Raths 2017). Agile requires proactive involvement of the procurement offices, codesigning the contractual requirements with the vendors. At the same time, the procurement offices take the lead in ensuring that the contractual requirements are not locked into vendor specific proprietary methods and are interoperable with multiple providers.

## Agile Policymaking

Agile policymaking views policies as dynamic, which can evolve with changing context. The need for agility arises especially in uncertain contexts (e.g., unpredictable and exogenous shocks) where the policy solutions are not known beforehand. The COVID-19 pandemic reflects the uncertainty, wherein policies have had to evolve quickly within a few weeks. Traditional policy analysis already encompasses a stepwise decision-making process implied by Design Thinking: defining the public problem, formulating alternatives, identifying solutions, and then selecting an alternative based on explicit criteria.

Agility brings the important elements of time, iteration, and collaboration among different actors. Examples of Agile policy approaches include: policy labs (which experiment with policies and test them before implementation), regulatory sandboxes (testing regulations for novel financial products, technologies, and business models), and crowdsourced policymaking (through online engagement, such as CrowdLaw) (World Economic Forum 2017). As this report highlights, Agile has been applied to social policy areas such as family health, homelessness, addressing poverty issues, and public safety.

# Agile Adoption in State and Local Governments



State and local governments have increasingly adopted Agile methods in the last decade, applying them across a range of applications discussed above. At the same time, they vary widely in terms of their maturity levels in the adoption and implementation. Three broad phases could be distinguished in this lifecycle of Agile maturity among public agencies in general.

- **Infant phase** of adopting Agile is where a government agency transitions from waterfall to Agile. The organizational culture is predominantly waterfall oriented, with little to no prior experience in Agile methods. The organization requires assistance in transitioning to Agile methods, wherein employees require training. Since the organization has little experience, it requires a catalyst to foster Agile teams.
- **Adolescent phase** is where the government agency has experience in implementing Agile, but most projects are still conducted under the waterfall approach. Agile methods are followed for certain projects, but are not fully instituted into the organization's culture. Contracting and procurement processes for implementing Agile could be in their nascent stages. The adolescent stage presents an opportunity for scaling up Agile enterprise-wide.
- **Adult phase** is implementing Agile enterprise-wide in a systematic way. The Agile organizational culture is mature in using Agile as a default method. Employees have adequate exposure and training in Agile methods, so that Agile can be scaled up enterprise-wide. Design Thinking, Lean and Agile methods could be used seamlessly in tandem to ideate, to reduce waste, and to continuously learn through iterative development. Ideally, the organization would have put in place Agile contracting and procurement processes.

The three phases are not clear cut, with distinctive breaks between where one phase ends and the next one begins. Rather, they could be conceived as a continuum, as public agencies evolve through the lifecycle of implementing Agile. Indeed, consistent with Agile itself, its implementation is iterative and a process of continuous learning. Agile needs to be *Agile* itself.

As the organizational culture becomes more Agile oriented, the processes are also adapted to the changing environment. Agile is not a panacea of preset tools or practices. The adult phase is thus not a terminal phase of routine Agile implementation. It is an active phase of experimentation and learning, where the Agile methods themselves require adjustments and improvement.

**Federal adoption.** The United States Digital Service (USDS) and 18F, which are two federal agencies that were established in 2014 in the wake of the 2013 Healthcare.gov debacle, are arguably in the adult phase as they have honed the Agile development practices in the public sector. The USDS, which is housed in the Office of Management and Budget, focuses on technology projects that are of national priority. 18F is an office within General Services Administration (GSA) that provides consulting services to other public agencies in order to resolve technical problems and build public services through technology (Mergel 2017).

The USDS and 18F have established standard playbooks and guidance for adopting and implementing Agile methods. The USDS, whose mission is to “to deliver better government services to the American people through technology and design,” has developed a playbook of thirteen key plays for building effective digital services (<https://playbook.cio.gov>). The TechFAR Hub aims to bring industry standard best practices to federal digital service acquisition and procurement practices. The 18F's mission is partly to “effect change by practicing user-centered development, testing to validate hypotheses, shipping often, and deploying products in the open.” It has developed guides and provides advice on Agile related topics such as accessibility, content development, design methods, software engineering, product development, and user experience (<https://18f.gsa.gov/guides/>).

**State and local government adoption.** Both have been maturing very quickly in the last decade. State and local governments vary widely in their lifecycle of maturity, from infancy to late adolescent phases. According to a NASCIO (2020b) survey, 56 percent of the state CIOs reported widespread use of Agile. Of this, 39 percent said that Agile is not subject to centralized oversight or guidelines, and 17 percent stated that Agile is subject to centralized oversight or guidelines. About 38 percent of CIOs indicated that their state's procurement policies fully supported the use of Agile and incremental development practices.

**City and county government adoption.** They have also increasingly adopted Agile and user-centered design methods (Schank and Hudson 2018). Several cities such as Austin, Miami, Portland, San Diego, San Francisco and others have redesigned their web portals by employing user-centric design. Two counties—Miami-Dade and Santa Clara—are notable for instituting the position of Agile Coach since 2017 and 2019, respectively. The coaches have been instrumental in facilitating Agile transformation through training, facilitating teams, and aiding with sprints. Cities have also undertaken Agile methods to increase efficiency of internal management operations, enhance public facing services, replace legacy systems, and transform governance processes.

The USDS and 18F experiences have influenced, at least in part, how state and local governments have adopted and implemented Agile. A few state governments (e.g., Colorado, California, Connecticut, Georgia, Vermont) and some local governments (e.g., Oakland, San Francisco) have followed the footsteps of USDS to establish digital service offices (Wood, 2020). Many state and local governments have also instituted innovation offices (Burststein and Black 2014; Greenberg 2015). These offices aim to bring innovative methods and practices, including the use of Agile, to improve the delivery and efficiency of government services. The digital service and innovation offices are generally oriented toward external customer facing services and employ user-centric design methods to develop them.

Four in-depth cases illustrated below show how state and local governments have historically evolved through the lifecycle phases. These case studies are chosen because of their rich history of adoption and shows the trajectory of their Agile experience. They are all arguably in advanced adolescent phase of their Agile development, and provide good insights into Agile adoption for other public agencies. The state government case studies are from Connecticut and California; the local government case studies are from the cities of New York and Austin. Connecticut has a deep history of Lean ingrained in the state and has begun to employ Agile and user-centered design processes. California evolved in its project management practices to support Agile framework, and lately to user centered design. Agile and user centered design have emerged more broadly across state governments as a top priority in the last few years (Harrison 2018; NASCIO 2020a, 2020b).

At the local government level, the experiences of New York City and Austin illustrate the trajectory of using Agile and user-centered design for increasing efficiencies in internal organizational management as well as catering to the external consumer needs of public services. New York's case illustrates how the Service Design Studio has been instrumental in enhancing Agile methods and Design Thinking through its training activities and by engaging across a range of equity-oriented programs to increase accessibility to the city's services. Austin's case exemplifies how its Office of Innovation and the Office of Design and Delivery implement Agile and Design Thinking in internal management of government services (e.g., permitting) and to address long-standing social problems like homelessness.

# Agile in State Governments

GOVERNMENT

## Connecticut: LeanCT to Digital Services

Connecticut's LeanCT program represents the long-term evolution of reducing waste with Lean management and adoption of flexible development methods like Agile. The program evolved over three gubernatorial periods since the turn of the century. Emiliani (2006) documented how an ecology of Lean management emerged among businesses in Connecticut since 1979. The Connecticut businesses and business leaders had a significant role in the adoption of Lean management and its subsequent spread across the country. The state government agencies had begun to consider implementing Lean concepts in the 1990s.

Connecticut was among the first few states to experiment with Total Quality Management, Quality Circles, and other waste reduction methods. In 2000, Connecticut's Department of Labor began training programs in Lean. The Departments of Energy and Environmental Protection and Transportation were among the agencies to participate initially (Stoller 2015). Drawing on the state's growing Lean adoption in the private sector, Governor Jodi Rell (2004 to 2010) championed its adoption in the state government as well. Governor Dannel P. Malloy (2011-18) went further to enact legislations mandating the application of Lean principles. More recently, Governor Ned Lamont (2019 onward) established the Connecticut Digital Services (CTDS) to enhance Agile and user-centered design processes.

In 2011, Connecticut passed a legislation authorizing Office of Policy and Management (OPM-CT) to apply Lean practices and principles. They were initially required for five state agencies—motor vehicles, public health, administrative services, revenue services, and children and families. OPM-CT was designated to assist state agencies with business process analysis for (1) streamlining processes; (2) optimizing service delivery through information technology; (3) eliminating unnecessary work; (4) establishing standardized work flows; and (5) prioritizing available resources to promote economic growth, improve services, and increase workforce productivity. The bill codified the Statewide Process Improvement Steering Committee to support the initiative.

Also in 2011, the state legislature set up an Information Technology Policy Bureau within OPM-CT to establish plans and guidelines pertaining to the development, implementation, and use of the state's information and telecommunications systems. The synergy between the IT Bureau and OPM-CT became evident quickly as technological solutions were applied to problems identified through Lean principles. OPM-CT saw an opportunity to adopt continuous improvement techniques before implementing a technology solution.

The OPM-CT recognized that when an agency requested IT Capital Investment Program funding, there was scope to improve the process first or to work with other agencies that had a similar technology need. Consequently, any request for IT Capital Investment Program funding was then required to be accompanied by first removing waste from the process. Departmental IT purchases are made in accordance with the IT Procurement Lean process improvement activities (Raymond 2020). Lean management and technological solutions enhanced efficiency. For example, instituting business process changes and online forms in the Department of Motor Vehicles reduced the issuance time for vehicle titles from 145 days to 30 days; the Department of Revenue Service's reorganization led to savings of \$8.25 million in operational costs (OPM-CT 2012).

Lean was expanded statewide in 2013 with the LeanCT program, which aimed to assist in process improvement across agencies. The program supports and monitors continuous improvement statewide. The LeanCT thus provides an important function as a community of practice to learn nuances about the implementation of Lean in the state. It assists in contracting Lean resources, establishing standards, and providing strategic guidance on key projects.

The LeanCT also collects data on improvement efforts and reports to the governor. LeanCT jumpstarted a flurry of Lean activities across the state. With its assistance, 40 agency chiefs were designated Lean coordinators within their organizations, and over 2,000 employees obtained training in Lean management. Kaizens organized across the government agencies since then have reportedly culminated in significant performance improvements (Fisher 2015). Senior management participate in these kaizen events and have a high degree of visibility. In 2016, the Gemba Academy conducted a video case study of the LeanCT program (online at: <https://www.gembaacademy.com/guests/state-of-connecticut>).

With respect to Agile methods, Governor Rell issued a directive in 2007 for agencies to follow a System Development Methodology (SDM) set up by the Department of Information Technology. SDM is a mechanism for improving the management and control of the software development process. Although the SDM aimed to use industry best practices for keeping projects on time and cost effective, it prescribed the use of a seven-stage waterfall methodology. The SDM did not facilitate the adoption of Agile iterative methods per se, although it did not prohibit Agile use either (Wood 2017). Consequently, the Office of Planning and Management issued the Policy for the Management of State Information Technology Projects in 2017 (OPM-CT 2017), which provided more explicit guidelines on planning and execution of projects to promote better control over technology project timelines, costs, and quality.

The OPM-CT's guidance explicitly included the scope for Agile among the project management methods. The Department of Children and Families' CT-KIND (Kid's Information Network Database) (2018) project to overhaul its two-decade old legacy system was among the first large projects to use Agile methodology. The CT-KIND project identified a pool of vendors for undertaking smaller modular contracts; the project is thus carried out through multiple vendors using iterative delivery process. The project's staff were trained and certified in the Scaled Agile Framework (SAFe) methodology to carry out the project.

Governor Lamont established the Connecticut Digital Services (CTDS) under the Department of Administrative Services in April 2019, which is modeled after other government digital services in the United States, United Kingdom, and Canada. Unlike LeanCT, which is oriented internally toward streamlining internal processes, the CDS's mission is oriented externally to help the government leverage technology, data, and design for delivering better citizen services. One of CTDS's major focus areas is Agile procurement, which aims to: attract high quality vendors, implement evaluation methods that require vendors to show rather than tell, move quickly from RFP posting to delivering a minimum viable product (MVP), structure IT projects in a modular way, establish interoperability systems, and engage vendors to improve procurement processes.

CTDS provides guidance to implement Agile and modular procurement practices that emphasize functional software and user research in each project. The CTDS implemented two projects using Agile methods. The first is a Business One Stop (BOS), which is a one-stop portal (<https://business.ct.gov/>) business owners to deal with state agencies, and to register and manage their businesses online. The BOS began as an integration of services of a few agencies, which would grow and eventually become a hub of the state's public facing services. The second project is Real ID Wizard. It guides Connecticut residents to prepare documents for obtaining Real ID, which became exigent in the face of the federal deadline of Oct 1, 2020. (Real ID is required to access federal facilities and travel by air since this date). The CTDS has its own dedicated budget and a small team that oversees its operations. It works closely with other state agencies in prioritizing the service projects.

## California: Project Management Office

The California Project Management Office (CA-PMO) was established in 2016 within the California Department of Technology (CDT) to improve the management of IT projects. The state legislature envisioned that the CA-PMO would manage the state's large, complex, and costly projects that were experiencing challenges. The state had over 40 large-scale IT projects in 2015, then estimated to totally cost \$4.6 billion. (These complex and costly projects are categorized as “reportable” projects that require CDT's approval) (Taylor 2015).

The Fi\$Cal project exemplifies the complexity and scale of the state's projects. Conceived in 1995, the project began as a platform to consolidate budgeting systems in 2005. The scope was then expanded within a year to combine the state's accounting, budgeting, cash management, and procurement operations into a single, modernized system, to be completed by 2012. With changes in project scope and budget, the completion date was projected to be 2020 with total cost of \$1.06 billion—an increase of over \$400 million in project budget (Howle 2019). The problems with Fi\$Cal threatened to even affect the state's credit rating.

The Task Force on Reengineering IT Procurement for Success (2013) formed by Governor Jerry Brown provided 21 recommendations to the state for improving its procurement process. One of its major recommendations included the centralization of IT project management with trained staff to offer full-scale IT procurement services under the CDT. The Task Force also took note of shortcomings of the “one-throat-to-choke” (p. 15) model of procurement (where a single vendor is responsible for project management, subcontracting, and implementation) and recommended to explore alternative contracting methods for modular software development (including Agile) adopted by the federal government. Consequently, the California legislature provided funding for planning the centralized PMO in the 2014-15 Budget Act (Taylor 2015). The central PMO was designed to overcome the challenges due to the lack of experienced project management staff in the decentralized structure.

The CA-PMO's mission is to provide “centralized project management of IT projects so that strategic benefits are realized through standardized frameworks, education, training, and tools and techniques based on proven best practices and lessons learned” (Taylor 2015, 12). Its statewide activities (e.g., training) are paid from general funds, while specific project management services are paid by the departments.

The CA-PMO offers three service models to manage IT projects: (1) advisory services, where the CA-PMO provided short-term consulting to the sponsoring department; (2) targeted project management, where the CA-PMO augmented the department's project management team with experienced staff; and (3) full service management, where the CA-PMO project management team assume day-to-day management of the project. Furthermore, the CDT replaced the traditional procurement method of using Feasibility Study Reports (i.e., identify the problem, evaluate alternatives, and provide the technical solution) with Project Approval Lifecycle (PAL) method (which comprises four stages: business analysis, alternatives analysis, procurement analysis, and bid analysis and finalization of projects) (Taylor 2017a).

The CA-PMO developed the Agile project management framework as a complement to its suite of project delivery and testing methods. Some of the state agencies were already advocating the use of Agile methods, but there was limited capacity and training offered in these methods to the state employees dealing with IT projects. So, the CA-PMO partnered with CDT's statewide training center and other organizations to offer training and resources in Agile methods, centering on scrum, user-centered design, and incremental and iterative development.



Initially, the CA-PMO championed small sized projects that were manageable within short timeframes for both waterfall and Agile projects. It brought in Agile coaches to support the pilot projects. The training sessions matured into project management leadership academy, which included curriculum on modular and Agile development.

The CA-PMO also developed playbooks with resources, toolkits, and templates for state agencies to adopt Agile delivery methods. These playbooks include frameworks for Agile (CA-Agile), Project Management (CA-PMF), Organizational Change Management (CA-OCM), California Business Process Reengineering (CA-BPR) and Software Development Lifecycle (SDLC) plans and tools (<https://projectresources.cdt.ca.gov/>).

The CA-PMO, however, realized two major challenges in implementing Agile.

- First, public sector organizations have aging legacy systems. IT modernization needs to take the legacy systems into account and the new systems should integrate with the existing systems. The modernization approach is distinctive from Agile methods that deal with innovating and building products from the scratch. Executive and IT leaders need to collaborate and develop governance procedures for the modernization and legacy system integration.
- Second, Agile training and project management approaches that focus narrowly on scrum and other development methods skip the broader enterprise-wide conditions required for the implementation of Agile. The enterprise-wide approach requires a systems development or total portfolio management, with a focus on governance processes that facilitate successful implementation of Agile. These include, for example, methods for chartering a project, having a committed team in a co-located space, appointing a full-time product owner who is relieved from other day to day duties, etc.

Organizations take time to adapt to such governance changes. The CA-PMO, therefore, advocated agencies to start with a small pilot project and test drive it, rather than starting with a major large project. The agency managers can see how Agile process works, the benefits it has, and the business value for the organization. The managers could become internal champions to promote the Agile methods internally. The agency leaders can then adapt the governance processes, learning more about iterative and incremental product delivery, assigning roles, user journey. Public agencies can thus expand the use of Agile methods after these processes are put in place.

Lastly, the CA-PMO facilitated Agile procurement by identifying a prequalified vendor pool for Agile related projects. The vendor pool is prequalified to offer key staff services for consulting, user-centered design, and software development to assist in Agile and related methodologies for IT project delivery. They would have demonstrated ability to develop prototypes using Agile methods. The prequalification reduces the solicitation time and administrative costs to the state government and the vendors as a limited pool competes for bids.

Contractually, the CA-PMO adapted the work order authorization (WOA) process, which gives the vision of a release plan or the sprint plan. The WOA acts as a miniature agreement (within an overall contract) between the vendor and the state government to deliver a product. The WOA gives project flexibility in terms of adjusting priorities in short turnaround times. It allows adjustments in terms of starting off with a small workforce or a small set of contractors and flexible decision-making as a project progresses.

Early evaluation of the CA-PMO showed that it was valuable in providing project management services to projects of different sizes from six departments. The projects were primarily in the first two categories of assistance (advisory or targeted project management). The CA-PMO was unable to fulfill requests for direct services from at least seven departments (Taylor 2017b).

The evaluation identified two potential issues and made recommendations to resolve them. The first issue was the conflict of interest between CA-PMO and the CDT, since CDT oversaw CA-PMO and evaluated the sponsoring department projects. To avoid this, the evaluation recommended a firewall between CA-PMO and CDT. The second issue was that the CDT instituted a policy that the CA-PMO would deal with low-complexity projects, rather than the complex reportable projects. The narrow eligibility of projects would mean that the CA-PMO would not fulfill the legislature assist with complex projects that were more risky. The evaluation suggested for the legislature to reassert its original objectives for the CA-PMO in statute.

While the CA-PMO has largely focused on internal project management features within the state government agencies, another agency called the Office of Digital Innovation (ODI) was formed by Governor Newsom in 2019 to focus on building user-friendly state service delivery models (i.e., customer facing applications).

The ODI is also a part of the CDT, housed within the Government Operations Agency (GovOps). The ODI's core mission is to improve and simplify the digital experience that people and businesses have with the state government. In this, the ODI would work with state departments to reengineer their business processes and develop and implement digital services. For example, the Department of Motor Vehicles (CA-DMV) has faced significant customer service challenges. Hence, the CA-DMV is among the prime candidates for ODI to work with and to provide better customer service. The ODI also established a new Innovation Academy to train state government executives, managers, and supervisors on change management, continuous improvement, human-centered design, service design, and product management. The Academy expands the ongoing Agile training opportunities to project managers statewide.

# Agile in Local Governments



## New York City: NYC Opportunity's Civic Service Design Studio

The New York City Mayor's Office for Economic Opportunity (NYC Opportunity) is emblematic of applying Design Thinking while using Agile methods. The NYC Opportunity was formed in 2017 by consolidating the Center for Economic Opportunity (CEO) and Health and Human Services-Connect (HHS-Connect) programs, which were under the Mayor's Office of Operations since 2014.

CEO's primary goal was to develop and test new anti-poverty programs using rigorous evaluations; HHS-Connect aimed to break information silos by using modern IT and by coordinating between agencies to holistically support clients of the city's health and human services. The NYC Opportunity combined the offices' strengths to advance Mayor de Blasio's goals to reduce poverty and increase equity. The office advances research, data, and design to advance evidence-based programs, policies, and service delivery. The Access NYC was among the early flagship projects that was redesigned using human-centered design methods (Kennan 2018a). The project provides seamless benefits and eligibility information for over 40 city, state, and federal benefits and services in different languages.

### Agile mindset in New York City

The Mayor's Office for Economic Opportunity (NYC Opportunity) uses evidence and innovation to reduce poverty and increase equity. It advances research, data, and design in the city's program and policy development, service delivery, and budget decisions.

The NYC Opportunity has five interrelated arms through which it advances evidence-based policies:

- **Research** arm oversees methodology for measuring poverty and to track indicators of well-being.
- **Service Design Studio** (SDS) has the mission to make public services more accessible to New Yorkers; it uses human-centered design methods to analyze, test, and build program and product solutions.
- **Digital Products** (DP) team produces public-facing services and tools; it uses Agile methods to conduct user research, create user experience, and develop digital services for the city.
- **Data Integration** (DI) team facilitates cross-agency data sharing and works across bureaucratic silos to deliver holistic public services.
- **Programs and Evaluation** (PE) unit oversees program development, implementation, performance monitoring and evaluation for all of NYC Opportunity's initiatives.

These NYC Opportunity units work closely with the Department of Information Technology and Telecommunications (DoITT) and external technology teams for developing and delivering digital services. The DoITT's Government x Design: Citywide Design Services was the result of such collaboration to seek design services from consulting firms.

The NYC Opportunity uses Agile methods to develop and test prototypes. The DP team is especially equipped with Agile specialists, including product managers, developers, business analyst, content strategist, and training specialist (Kennan 2018b). The team conducts a daily stand-up meeting to share what each member is working on, including any major announcements and request for help. The team breaks large projects into discrete tasks of one- to two-week sprints. This helps in monitoring the team's work-in-progress and completed features and reprioritize tasks between sprints. The sprints are followed by team retrospectives held by the product managers to share ideas on what the team should keep doing, stop doing, and start

doing to better communicate and collaborate. The process is thus iterative and incremental, with built-in continuous learning processes through team reflections in developing the prototype of digital services (Kennan 2018b).

The novel aspect of the New York City's use of Agile methods is that it is perhaps first among the city governments to the SDS as a dedicated unit for Design Thinking. The SDS conducts user research and creates user experiences in the development of prototypes. The SDS team is comprised of designers with capacities in user design, interface, and experience. The SDS was launched in October 2017 with funding support from Citi Community Development. It acts as an internal design consultancy for New York City government agencies for designing public facing government services. The SDS incorporates design and user experience at every stage.

The SDS considers design as how things work, rather than only focusing on visual aesthetics. It takes a contextual approach for designing a program, product, policy, or service: the context of operation, the value for potential clients, daily processes and workflows, staff skills and perspectives, clarity of communications, and physical environments. It considers people, processes, communications, and technology as part of the solution. It espouses civic service design based on these principles:

- Create with the people who use and deliver them
- Prototype and test for usability
- Be accessible to all
- Equitable distribution
- Rigorous testing and evaluation.

The SDS developed a guide for applying service design techniques to public services, called *Tools+Tactics*, which identified 18 practical techniques for the city agencies to implement (available at <https://civicservicedesign.com/>). To enhance service design across agencies, the SDS undertakes three types of activities.

- **Office Hours** are one-hour work sessions with a designer for the city's public agencies. Public agencies beyond New York, including cities from abroad, have utilized the Office Hours to brainstorm about design of digital services.
- **Workshops** are training sessions on civic service design for the New York city staff. These sessions are small group sessions (of about 20) to equip city agencies with service design capabilities, so that the design capacity is decentralized among the city staff.
- **Civic Design Forum** is a community of practice for the city government employees using Design Thinking. The forum is hosted by SDS, and run in partnership with DoITT's NYC Gov Lab & Studio and the Department of City Planning's NYC Planning Labs. The forum is comprised of in-person meet-ups and a listserv open to all City of New York employees.

The SDS staff takes up a small number of projects that they are directly involved in. The SDS puts forth a call for Designing for Opportunity (DFO) projects among the city agencies, whereby the staff selects projects where user design and experience are required. The DFO project undertaken by the SDS includes one with the Administration for Children's Services (ACS) Division of Prevention Services. The ACS project aimed to give voice to the families who seek services to prevent children from entering foster care.

When a child is not taken from home, the family is referred to prevention services offered by nonprofits. Typically, these families are low income and often from minority communities. The prevention services help parents to juggle between parenting and work or getting stable employment. The DFO project created a prototype of service matching, in order to match fam-

ilies with contracted service providers. The portal would enable families to select the contracted providers based on their preference, rather than the agency making that determination.

SDS has been involved in public-facing digital services, which include ACCESS NYC, Growing Up NYC, and Generation NYC. These products are aimed to assist low-income New York residents with benefits, programs, and resources.

- **ACCESS NYC** is an online screening tool to determine a person’s eligibility for health and human service programs. The program was initially redesigned in 2016 using iterative process by engaging residents, social workers, case managers, and other city workers. It was relaunched in 2017 with a simplified ten-step process, with plain-language and many languages, and accessible on mobile devices. The code is open source, available in GitHub for others to use.
- **Growing Up NYC** is a platform developed in partnership with the NYC Children’s Cabinet in order to connect families with community benefits and resources. It was built using human-centered, iterative design and launched in 2016. Growing Up NYC makes family friendly services from various city departments accessible to the residents. The Growing Up NYC was later accompanied by a companion website—**Generation NYC**—for teens and young adults. Input was sought from many residents to design the site.

In their evaluation, the Abt Associates (2020) recognized the SDS as a novel approach to civic service design. The evaluation found that there is broad support for the SDS and its techniques among the city’s agencies, and participants were overwhelmingly satisfied with the SDS Office Hours, Workshops and the DFO process. The participants aimed to use the service design techniques in their organizations. They also perceived the SDS contributed to their working in new ways. Although there were perceived barriers to spreading the adoption of service design (such as lack of time, funding, buy-in from agency leadership, and knowledge of service design among colleagues), these barriers reduced over time. The evaluation highlighted two strengths of the SDS for other cities to adopt the service design approach: First, it is a centralized, in-house resource that is easily accessible to the city’s agencies, and second it emphasizes an evidence-based approach to promote better outcomes.

## City of Austin: Office of Innovation/Design and Delivery

The impetus for using Agile and Design Thinking methods in the City of Austin originated with the Office of Innovation. Following the nationwide open government movement in the first Obama administration, Open Austin was formed in 2009 as a volunteer citizen brigade affiliated with Code for America. It advocated for open government (which resulted in Austin Government Online, AustinGO), open data, and civic application development.

The brigade conducted hackathons for civic services, open data portal, and website and app development with the participation of Austin city departments. It championed Agile software development and cloud computing with the city agencies. The grassroots efforts

### The Agile mindset

Establish a workplace culture of high performance, continuous improvement, and human-centered innovation that encourages employee growth and inclusive collaboration. In addition, embrace technology, rapidly prototype potential solutions, and improve business processes to increase efficiencies and reduce red tape.

—Strategy (#13), “Government that works for all,” Austin Strategic Direction 2023

resulted in the city council also formally committing itself to open government in 2011 with the principles of transparency, efficiency, and collaboration. Subsequently, the council approved a resolution to set up an Innovation Office in 2012 to provide dedicated staff for open government and ongoing digital innovation.

The office was formally launched in 2014 with the mission to “help diverse and inclusive teams examine challenges and opportunities to surface better ideas and solutions that make a lasting, positive impact” (O’Connor 2015). It has three areas of focus: internal management innovation, open government, and public service innovation. It works with city agencies and community partners to develop, test, organize, and encourage innovative projects. Since it is a centralized team, with the same people working across different agencies, it can transfer lessons learned from one agency to another.

The Innovation Office and the city’s IT Department (Communications & Technology Management, CTM) established the Design, Technology and Innovation Fellows (DTI Fellows) program in 2016. The DTI program brought together civic-minded designers and developers to transform municipal service delivery by bringing the principles, values, and practices of the IT industry to government. The founding fellows were alumni of other federal digital service agencies such as 18F and U.S. Digital Service, including the Consumer Financial Protection Bureau.

The DTI program was expanded over the next three years, with over 70 design and technology specialists. Many of them were from Austin, who had private sector experience in technology firms and who had expertise in user-centric methods. The fellows worked directly with departments employing user-centered design principles, refining their practices for iterative, open-source development, and establishing a creative culture. The DTI became the Office of Design & Delivery (ODD) in 2018, when it became a permanent part of the CTM. The ODD designs and builds public facing digital services for Austin’s residents. It leads design, development, and product strategy for Austin’s smart city initiatives.

The ODD is guided by six principles, which are relevant to its adaptation of Agile methods:

- Put residents first.
- Prioritize equity when planning features and functionality.
- Recognize that digital services require teams and competencies, not just software.
- Cultivate a community of learning.
- Champion iterative, data-informed methods.
- Support vendors that can prove value to residents.

The Service Design Lab is a part of the ODD that is devoted to Design Thinking. The SDL facilitates city employees to work across organizational silos and directly with community members to design new programs, processes, and policies based on community needs. The team is comprised of UX designer, user researcher, and service designers.

The SDL has three areas of focus. The first is Research & Design, where the team obtains input from stakeholders, analyzes the data, and conducts field research to understand problems and then prototypes the solution. The second area relates to Technology & Processes, where the team analyzes and develops the technologies and processes underlying services to identify gaps and areas for improvement. The third area is Community Engagement, where the team brings together city staff, residents, and community organizations as partners.

Six characteristics of the DTI program are notable, if other cities were to employ such a program for adopting Agile methods (Guhin 2018; Hudson 2018).

- **First is funding**—the program was based on a cost-recovery model of working with departments across the city. It collaborated with the city agencies to allocate budgets based on the agency’s desired outcomes for improving services. The DTI did hiring and project management, and departments paid for salaries and coordinated with stakeholders.
- **Second, the teams were assigned to projects and products** that were scoped around desired outcomes, not predetermined technologies or solutions. They did not follow a formulaic approach of scrum; rather the team adapted the methodology based on how to solve a problem.
- **Third, the fellows were carefully chosen based on several competency indicators.** The program forked NYCTechJobs and United States Digital Service for Agile recruitment, applying human-centered techniques to inculcate agency buy-in and prioritize a culture of learning.
- **Fourth, the teams were deployed flexibly,** based on project needs, rather than a hierarchical reporting structure.
- **Fifth, the role of leadership matters**—it evolves over time, playing a supportive role in forming and protecting teams initially, and becoming inconspicuous after forming a self-driven team.
- **Last, but not the least, the DTI program recognized the significance of community engagement** in the context of applying Agile in government. According to Ben Guhin, one of the cofounders of ODD, the community engagement is crucial since government decisions are essentially political. Agile methods like Scrum cannot be applied out of the box in governments and needs to be adapted to take the political reality into account.

The Innovation Office and ODD have fostered a community of practice to share their stories and experiences of applying human-centered design. The Innovation Office hosts the virtual Innovation Community of Practice, which is an online platform to maintain a conversation about civic innovation. The platform helps in disseminating the city’s innovation stories and to mentor city agencies facing common issues.

The office curates the *Civiqueso*, an online forum hosted on medium.com that documents the “stories of design, technology, and innovation in the civic melting pot of Austin, Texas.” As Austin is committed to open source projects, the offices have made their resources available through GitHub and other open platforms (<http://projects.austintexas.io/projects/becoming-odd/about/overview/>). The ODD has developed guidelines for user research (<https://cityofaustin.gitbook.io/user-research/>) and styles for providing digital services (<https://cityofaustin.gitbook.io/digital-style-guide/>). Its documentation of hiring process also provides lessons for hiring professionals for Agile and user-centric methods (<http://projects.austintexas.io/projects/becoming-odd/recruiting-and-hiring/approach/>).

Besides the city government offices, Austin’s history as a technopolis provided the ecological context for innovative technological practices (Smilor, Gibson, and Kozmetsky 1988). Austin’s public-private partnerships since the 1980s made it an attractive hub for large and small technology firms to locate, including homegrown companies (Straubhaar, et al., 2012). The regional innovation system evolved with the support of city government, the chamber of commerce, and the research support of the University of Texas at Austin (Gibson and Butler 2015).



Austin is the home of the SXSW Conferences & Festivals, which attracts creative professionals from high-tech firms around the world. The city has had a rich history of culture and counter-culture with music and film industries, organic food movement, and game development (Patoski 2019). The origin of the city's Innovation Office itself could be attributed to the city's tech culture. The Innovation Office and ODD, in turn, have been able to tap into the city's vibrant tech culture as many of their employees are recruited from the local talent pool. The offices participate in the community events for idea generation, crowd-consulting, and hackathons. They have also used the local tech startups for their activities—e.g., the community of practice is hosted on Bloomfire, an Austin-based knowledge sharing platform.

The Innovation Office and ODD's projects show how Agile and human-centered design approaches have been used not only for traditional IT software application development (e.g., open government, permitting), but also for addressing social issues (recycling, homelessness, and public safety).

- **Open government** has been a long-standing pillar for nearly a decade on which the Innovation Office was established. Since 2016, the office has partnered with Open Government Partnership, an international nonprofit championing openness and transparency (<http://cityofaustin.github.io/open-gov-partnership/>). The partnership resulted in projects such as development of an equity assessment tool, an online city project tracking tool, setting up an Open & Smart Advisory Committee, and improving city council public meetings. More recent open government commitments relate to a community climate resilience pilot project, enhancing public participation in city anti-displacement efforts, public safety data analysis, and including the homeless in court contracting.
- **Permitting Initiative** sought to streamline the city's complex process of getting building permits, which was spread across fifteen departments. A report by Zucker Systems (2015) highlighted the complexity of the permitting process and the inordinate time for obtaining permits. The city's Development Services Department partnered with the Fellows program to make the permitting process more accessible and cohesive. They used the Design Thinking process to identify the inefficiencies in permitting process.

They formed three teams to address the problem. The Web Resource Team worked on presenting standards and rules of permitting process in an intuitive way. The Service Experience Team focused on customer and employee experiences, including the business processes required for permitting. The Communications Team designed a workflow for streamlining permitting process.

The project culminated in the creation of a residential permitting website ([PermittingATX.com](http://PermittingATX.com)) launched in 2017. The website provides a simple, interactive way for a customer to understand the permitting process through a few clicks. A residential toolkit enables staff and customers to communicate more effectively about permit requirements. The Service Design Lab has since worked on employing the human-centered design process for identifying pain points in the permitting process of community gardens and streamlining it (Luedtke, 2019).

- **Zero Waste Vision**, formulated in 2011, envisioned that the city would reduce the amount of trash sent to landfills by 90 percent by 2040. However, the Austin Resource Recovery (ARR), the city's department responsible for implementing the program, found that the recycling had plateaued at about 42 percent in 2015. The DTI program then partnered with the ARR in 2016 to examine why and to develop prototypes for enhancing the recycling process (Rockwell 2017). The combined team used human-centered design and Agile methods to develop solutions for making Austin a more recycling-friendly city.

The human-centered design involved interviews and participant observation of how different families recycle, and how they feel about recycling. The observations provided insights into the recycling behaviors of the families. The teams then undertook design sprints to build prototypes of the solutions and test with the users (<http://projects.austintexas.io/projects/vision-zero-waste/about/overview/>). Such solutions included a household disposal sorting guide, an outreach and assessment tool for ARR staff, and an ARR content strategy for communicating across families with different types of recycling behavior (Thibault 2017; Trujillo 2017). The multifunctional team with both DTI and ARR members helped them share their ideas frequently and received critical feedback. The ARR team members also received training on Design Thinking methods in the process (Duong 2017).

- **Solve for Homelessness** project traces back to 2017, when the Bloomberg Philanthropies awarded a \$1.24 million grant to design and deliver bold solutions to solve homelessness. The City of Austin's Innovation office, the Department of Public Health, and a nonprofit called the Ending Community Homelessness Coalition came together to facilitate the Austin Homelessness Advisory Committee (AHAC), which is an advocacy organization comprised of members who had themselves experienced homelessness in the city. The ECHO then formulated the *Austin's Action Plan to End Homelessness* in 2018 (ECHO 2018), which was also endorsed by the City Council.

The plan highlighted five elements to reduce homelessness: provide outreach services and shelters, address disparities, provide housing and support services, strengthen response system, and build community commitment from public and private sectors. With funding from Bloomberg Foundation, the Innovation Office's iTeam undertook a human-centered design process to "solve for homelessness" by gaining insights into the problem (Clark-Madison 2018).

The sprints studied the lived user experiences of homeless people and the process of sheltering provided by the city. The sprints yielded 15 insights for strategic actions, which included problems related to homeless individuals (e.g., health and safety, mental health, substance abuse, securing jobs, family conflicts) and agencies dealing with such individuals (e.g., coordination between the agencies, limited range of police tools, lack of support services, overt focus on physical needs to the neglect of emotional, mental, and social support) (City of Austin iTeam 2018).

The insights were used to develop prototypes of homeless services, inform changes in city laws, and improve sheltering process with the feedback of AHAC (Larsson 2019). Prototypes of solutions have included MyPass, a blockchain based secure ID for homeless people (Khurshid, Rajeswaren and Andrews 2020); violet bags for collecting garbage and disposing at selected sites to keep the homeless camps clean; Violet KeepSafe Storage program, a transition storage service to help homeless people keep their belongings in a safe place (City of Austin Communications and Public Information Office 2019; 2020).

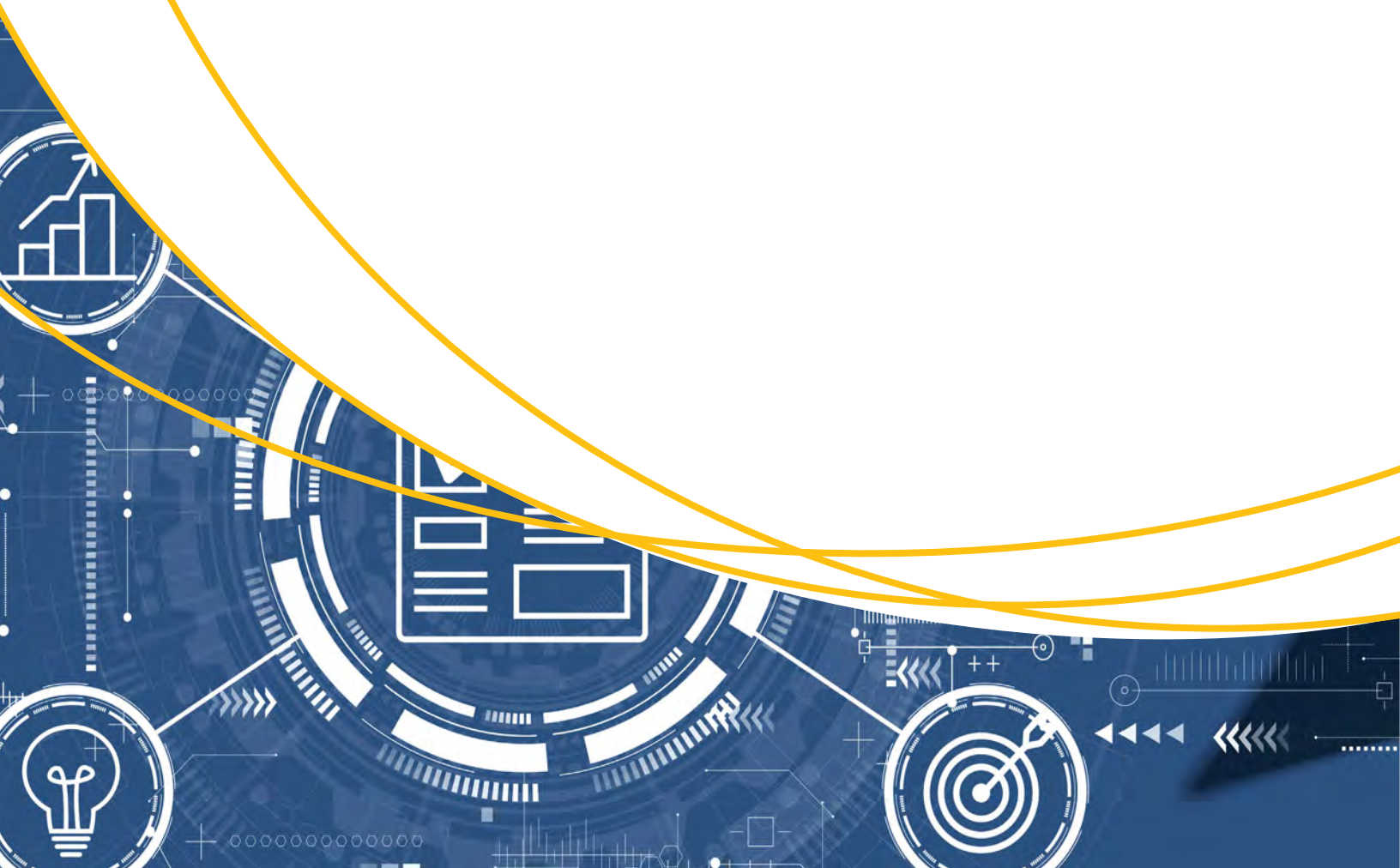
In 2019, the iTeam started partnering with the Neighborhood Housing and Community Development Department to focus on housing stability in order to protect the most vulnerable (low income) residents from displacement (<http://projects.austintexas.io/projects/bloomberg-iteam-displacement/about/overview/>). The iTeam conducted needs assessments in sprints to identify the problems with accessing utility assistance and home repairs services programs. The sprints discovered the paradoxes in the programs, which limit the assistance and services that could be undertaken.

- **In the public safety area**, a project for improving feedback and complaint process with the Office of Police Monitor (OPM-ATX) aimed to ease and simplify the process. The project began with a push from community organizations like Austin Justice Coalition to improve the police complaint process after a 2016 police shooting. Consequently, Austin included the enhancement of complaint process as a part of the negotiation with the police union when the police contract expired in late 2017.

The OPM-ATX employed the ODD and the Austin Tech Alliance to identify methods of easing the complaint process. The ODD used the “divergence-convergence” model of Design Thinking to empathize and discover the problems of complaint process and to prototype the solutions. The Austin Justice Coalition became a part of the working group on providing feedback on the solutions. The ODD team interviewed users on how they navigate the system and talked with staff on how they register complaints; they shadowed users observing how they undertook the whole complaint process.

The team discovered logistical hurdles, lack of transparency, and lack of institutionalization (OPM-ATX 2018), including the cumbersome nature of complaint process (which included filling out official forms and notarizing them). The team came up with a prototype of simpler complaint process that can be done online anonymously, which could allow for any Austin resident to provide feedback. The OPM’s role was also strengthened with expanded oversight powers to become the Office of Police Oversight (OPO).

# Enabling Strategies For Agile Implementation



Agile is a mindset of organizational change. As a process of continuous improvement, Agile methods themselves could evolve over time with doing, testing, and improvement. The Agile process itself could evolve with maturity. The four case studies show different trajectories of adopting Agile in state and local governments. The strategies for adopting and implementing Agile methods broadly differ in the three lifecycle phases of infancy, adolescence, and adulthood. The strategies are summarized in Table 1 and discussed below.

**Table 1. Phases and Strategies of Agile Implementation**

Phases	Characteristics	Enabling strategies
1. Infant Phase	<ul style="list-style-type: none"> <li>• Predominantly waterfall projects; little to no prior Agile experience</li> <li>• Fostering Agile team requires help</li> </ul>	<ul style="list-style-type: none"> <li>• Start Simple with a Small Project</li> <li>• Catalyze Cross-Functional Agile Team</li> </ul>
2. Adolescent Phase	<ul style="list-style-type: none"> <li>• Several Agile projects, but majority are still waterfall</li> <li>• Self-reinforcing Agile teams</li> </ul>	<ul style="list-style-type: none"> <li>• Institutionalize Agile Acquisition Procedures</li> <li>• Cultivate Agile Community of Practice</li> </ul>
3. Adult Phase	<ul style="list-style-type: none"> <li>• Agile projects by default</li> <li>• Sustain Agile teams</li> </ul>	<ul style="list-style-type: none"> <li>• Establish Agile Management Support</li> <li>• Sustain Agile Organizational Culture</li> </ul>

## Start Simple with a Small Project

Experienced Agile project managers in state and local governments advise that agencies should adopt Agile project management slowly. Since the culture of waterfall has existed for a long time, the organizational processes are mainly oriented toward waterfall methods. Supplanting the waterfall culture would take time. Employees may have little to no exposure to Agile methods and may even be skeptical. They could be resistant to changing traditional ways of doing things.

The director of California’s Project Management Office explained, “We do promote that you start with something small, something that is attainable. They can see how it works, see how the outcomes can be positive, where you get the highest business value and then you are able to grow it and you actually get internal champions to help promote it—versus, to see it as a new process that people are having to learn.”

The 18F’s advice for overcoming barriers to government’s adoption of user-centered design is: *Dip your toe in*. The small initiatives build confidence and allow for testing risky hypotheses while avoiding costs of redoing or redesigning government services (Jonnalagadda and Maier 2019).

Simple and small-scale pilot projects give an opportunity for the Agile teams to experiment with the Agile methods. Simple projects are well-defined in execution—i.e., they address one standalone user story. They should also be small-scale without any dependencies so that they can be potentially completed in one sprint. Implementing the pilot project should not be onerous on the organization with respect to human or financial resources. Starting with simple,

small pilot projects may seem like “low-hanging fruits.” Yet, these projects provide a path forward for introducing Agile methods to the organization’s employees, with very low stakes. As Agile is iterative and incremental, starting with a small, well defined project fits the framework well.

The cumulation of successful experiences provide future directions for implementing Agile. Successes increase faith in the Agile methods about their prospects for resource efficiency, timeliness, and end user satisfaction. Poor implementations of Agile resulting in failure create a reluctance to implement the next time. As Ed Toner, Nebraska’s CIO maintained, “For those governments that haven’t looked at Agile and want to dip their toes into the water, it’s important to pick the right pilot project, something that can offer ‘quick feedback and quick wins.’” Haight and Read (2016) also expressed a similar sentiment, “Your first Agile project should be a project that’s not too large. Pick something that has a high probability of success, is easily defined, and can be broken down into digestible pieces.” The initial project successes could ameliorate internal resistance and other units could follow suit.

## Catalyze Cross-Functional Agile Teams

Public agencies in the infancy of adopting Agile methods do not have experience in establishing Agile teams. Kickstarting Agile in the beginning requires leadership to catalyze, support, and protect cross-functional teams.

The catalyst is a leader who can span across departmental siloes to bring together relevant experiences for the project at hand. She enables the formation of the cross-functional team by getting the key representatives from technical (e.g., developers), the business or service units (i.e., the operations division, management), and the user groups together.

In the initial stages, the Agile team needs support with adequate training and resources. Training in Agile methods such as value stream mapping, scrum, Kanban, or UX design prepares the team technically. Independent consultants or agencies experienced in Agile methods can provide such training. Two counties (Miami-Dade and Santa Clara) have been innovative in directly employing Agile coaches.

Lastly, as the Agile mindset is still in its nascency, the cross-functional team needs protection from internal and external distractions so that the team can complete its tasks. The leader should be able to protect the team’s time from outside organizational influences interfering in the team’s work and negatively impacting a sprint routine and its performance. Project leaders can protect the team using simple techniques such as Kanban boards, which provide transparency into the team’s project priorities and show how the activities add value to the user.

Leaders at different levels of organization can catalyze, support, and protect the Agile teams. Upper level leader’s (CxO suite) buy-in is not only catalytic during the formative stage, but also conducive for long-term sustenance of the Agile team. They can be instrumental in bridging across departments to bring together a multifunctional team. They have access to resources for providing the required training.

The middle-level manager is crucial since she has the intimate knowledge about the project tasks (Holmemo and Ingvaldsen 2016). As the CIO of Santa Clara emphasized, “My starting point is that you have to build excitement among the grassroots staff and ultimately it is the middle management that makes or breaks your effort to move to Agile.” The middle manager is often a project leader who is in charge of the day-to-day tasks and can protect the team from interference. The technical roles of the Agile team (product owner, UX designer, and other team

members) are rather well established. In the spirit of Agile, the team needs to be self-selected. The people and their interactions matter more than the process or tools.

Lean puts special emphasis on the organization as a whole with the involvement of the senior leaders from the outset to identify the value stream across the organization. The Lean champions are distributed throughout the enterprise who can act as catalysts for cross-functional teams. The champions cut across departmental siloes to connect with each other. They have the training, knowledge, and commitment to support Lean projects. The LeanCT program in Connecticut had thus created champions across the state government departments.

California had Agile champions in many of the state government departments. As the director of California's Project Management Office explained, "There are advocates or champions, people who become acquainted with something new and begin to look to adapt the new approach. We had several of them in our state departments who were considering using Agile to test it out as a concept." The CA-PMO then began to provide Agile training through the statewide training center. It brought in Agile coaches to support projects in the pilot stages.

New York's Service Design Studio (SDS) and Austin's Office of Design and Delivery (ODD) acted as catalysts for enabling cross-functional teams. The New York SDS is a small team of professionals experienced in human-centered design, user experience, and Agile methods. ODD is a larger team of professionals with similar experiences. New York's SDS provides training to other department professionals and acts as a catalyst to bring together cross-functional teams. Department representatives can consult with the design team. The SDS takes on very few city projects by itself.

In contrast, Austin's ODD partners with other city agencies to directly work on projects. Whereas the New York SDS plays a supporting role for Agile teams across departments, the Austin ODD takes on the role of an active partner in catalyzing and supporting cross-functional teams.

## Institutionalize Agile Acquisition Procedures

In the adolescent stage, a public agency would have experience with implementing several Agile projects, but the majority are conducted in traditional waterfall methods. The acquisition procedures (i.e., contracting and procurement) are also oriented toward waterfall methods, rather than for implementing Agile methods. The public agency would then face barriers in scaling up Agile beyond the initial Agile teams and expand the methods enterprise-wide. The acquisition procedures require overhauling to accommodate Agile practices so that conducting Agile projects do not require special permissions. Institutionalizing the acquisition procedures for Agile enables it to become a routine organizational endeavor, rather than an exception.

Transitioning from waterfall to Agile methods must take into consideration the significant changes that the new methods imply. Principally, the characteristics of Agile—as iterative and incremental process, continuous improvement and delivery, and the user-centric frameworks—come into play. Large projects are broken down into smaller projects that can be conducted in a few sprints. The acquisition procedures also need to be centered on these principles.

Whereas waterfall methods focus on awarding the project to one large contract, Agile methods require the project to be conducted in small "bite" sized projects that can be added incrementally. Agile methods require coordination between contracts and close collaboration with the contractors to accomplish the project. The contracts are not a one-time process; they involve continuous interactions where the nature of the product could evolve over time with the

changing technological environment and user needs. The contracts are not driven by routine documentation, rather they are driven by the value added to the organization. Program managers need to work with stakeholders representing the requirements, systems engineering, contracting, cost estimating, and testing communities to design processes around short releases. Acquisition executives could streamline the decision process by empowering small, dynamic, government contractor teams.

In the initial stages, when the acquisition processes are not oriented toward Agile, the project management office (alternatively, the innovation office or the digital services office) could provide the requisite support for Agile acquisition. On one hand, these offices may themselves gain experience in Agile and offer such expertise to other departments. They could enter into informal or formal agreements with sister departments to conduct the projects in an Agile way.

For example, according to a senior executive of New York's SDS, "We have a process where we write up a project brief and kind of agreement. That basically just lays out deliverables, a timeline, and the basics. It includes a signature line for somebody on their team, as well as our director. Our process is standard, but once we send that over to an agency, it absolutely depends on the culture of the agency." Austin's ODD also has a standard formal agreement with the departments which wish to employ user-centered design services.

On the other hand, the project management office could champion acquisition methods that are suitable to Agile. The case study experiences show the different means of implementing Agile acquisition procedures. In Connecticut, the Office of Policy and Management requires agencies to consider process improvement and waste reduction when they request IT Capital Investment Program funding. The IT procurement across agencies is thus connected to Lean. The CA-PMO developed playbooks for state agencies to adopt Agile delivery methods. These playbooks include frameworks for Agile (CA-Agile) and Software Development Lifecycle (SDLC).

A common method among the government agencies to implement Agile is to identify a set of prequalified vendor teams who have experience in Agile methods. The prequalification enables the public organization to have access to stable expertise—the relationships are not one-shot, but are iterative and continuous. Collaborative relations are based on trust between the organizations, where performance of organizations is continuously monitored. The prequalified vendors are considered as partners who can codesign (rather than follow preset requirements), embrace emerging industry standards as they develop, and follow open standards (rather than getting stuck in vendor specific proprietary methods). The public agency is in charge of adjusting the contracts to fulfill the organization's changing needs. The prequalified vendors can be onboarded with different contracting mechanisms in a nimble way according to the project needs.

Contractually, there are several models for state and local governments for implementing Agile, some of which are based on 18F's experiences with federal acquisition. These include:

- **Blanket purchasing agreement** is used for recurring acquisitions with specific requirements. Having a pre-qualified vendor team with the BPA sets up a collaborative relationship between the public agency and the vendors. The BPA provides cost, time, and administrative effort savings, while offering flexibility, transparency, and control over the procurement.
- **Modular contracting** is the process of using contracts in successive, interoperable increments for complex projects. It aims to reduce risk while incentivizing contractors for timely completion. This type of contract seeks to avoid technology obsolescence through the incremental and iterative approach. Each increment could address changing user needs and take advantage of newer technological developments that occur during implementation.



- **Work order authorization** (WOA) process was adapted for Agile by California's Project Management Office. The WOA is a miniature agreement within an overall contract between the state government and the vendor to deliver a specific product (Eidam 2015). A work order gives the public agency the required flexibility to add a new function within the overall scope of the contract. It specifies the work, the price, and the duration within which the work needs to be accomplished. The work orders could be carried out on a *fixed price* basis, *deliverables* basis, a *time and materials not to exceed* basis. Agile incremental projects can be accommodated within the WOA process.
- **Invitation to negotiate** (ITN) is a flexible solicitation system for highly complex and customized goods and services, for which commercial solutions may not be readily available. It is suitable for Agile as it facilitates different relationships with contractors used by an agency. The ITN is intended to determine the best method for achieving a specific goal or solving a problem, and identifies vendors with whom the agency may negotiate in order to receive the best value. The agency may have pre-contract negotiations to codesign the solicitation requirements. ITN accommodates post-contract negotiations, which facilitates a change in the agency contractor relationships throughout the life of the contract (Lawther 2007).
- **Request for Innovative Ideas** (RFI2) is a novel procurement approach introduced in California by Governor Newsom in 2019 to obtain novel solutions to existing problems. The approach brings together innovators, entrepreneurs, scientists, vendors, and experts to collaborate on designing leading-edge solutions. It is implemented as an iterative procurement approach called Innovation Procurement Sprint (IPS), in order to deliver working solutions in an Agile way. Through the IPS, solution providers build prototypes, conduct demonstrations, and provide other necessary responses to the state. The state will then observe and evaluate the working solutions and award contract(s) based on these working-solutions evaluations. The IPS was first applied to obtain new solutions to address the California fires. The mechanism has since been applied to addressing the COVID-19 pandemic problem.

## Cultivate Agile Community of Practice

In the adolescent stage, public agencies have experience in implementing projects using Agile methods. The cross-functional teams themselves learn from these implementation experiences through retrospectives. The sprint retrospectives, for example, are feedback loops for the team to comprehend what happened during the sprint exercise and the lessons that the experience holds for future sprints.

Cultivating an Agile community of practice extends the learning process from within the team to the enterprise-wide context to verify the methods that work. The community of practice extends the peer support system and fosters an ecology of Agile environment in the organization. Agile practitioners can then have fellow peers with whom they can have informal interactions about their practices and how to improve on them. The community of practice thus acts as a forum for continuous learning and improvement beyond the teams. It could set the stage for the organizational culture to change from traditional waterfall methods to becoming more comfortable with using Agile methods.

The notion of communities of practice is not new. It has been applied for supporting the growth of new efforts across organizations. Wenger, McDermott, and Snyder (2002, 4) posit the community of practice (CoP) as social learning process, whereby a group of people "share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis." They found that active communities of practice share seven traits: they are organic and evolve over time; they have dialogs

with members inside and outside of the community; they have coordinators who organize community events and connect people at different levels; the members have relationships at both community and personal levels; they focus on delivering value to the organization; they are spaces for members to offer candid advice, share opinions, and try new ideas; and they have a rhythm of activities. Cultivating the community of practice at the adolescent stage spurs Agile team members to connect with each other and create an identity that enhances value to the organization and potentially expands the use of Agile among beyond the team. The Scaled Agile Framework (SAFe) also highlights the communities of practice as a means to exchange Agile knowledge and expertise enterprise-wide.

The impetus for setting up the community of practice could come from the top-level leadership (CxO suite), the project management or equivalent office, or from the voluntary efforts of the Agile practitioners themselves. At the federal level, the General Services Administration's Technology Transfer Services runs the Agile/Lean Community of Practice, which is a forum for the federal project managers, developers, agency leaders, and other public servants. The goals of this community of practice are to share best practices, provide learning opportunities, and serve as a voice for the Agile/Lean use. The U.S. Government Accountability Office (GAO) (2020), which identified best practices in the adoption and use of Agile in federal agencies and elsewhere, also highlighted the use of community of practice to sustain Agile.

There are various ways in which an Agile community of practice could be cultivated—as examples:

**In Connecticut**, the LeanCT itself acts as a community of practice by providing a forum for peer learning. It organizes Lean events for the state employees and connects the Lean practitioners. The state's IT department also initiated a community of practice in partnership with other agencies to learn and share topical developments in the field (Raymond 2020).

**In New York City**, the Service Design Studio hosts a community of practice called Civic Design Forum. The forum includes a listserv of New York City government employees interested in user-centered design and organizes face-to-face events. The listserv grew quickly with nearly 900 people. As a senior executive of SDS explained, "Every time that we send something out, we get new people. We just use that list to market our other services, and it's been a good system to grow our audience." The Forum has helped build expertise in user-centric design among the city's public agencies. The SDS's office hours have received critical acclaim as novel means of spreading the adoption of service design. The office hours have become a means of sharing expertise throughout the enterprise. The expertise is also shared through guides for applying service design techniques to public services, called *Tools+Tactics* (online at <https://civicservicedesign.com/>).

**In Austin**, the Innovation Office has taken a novel approach to host the Innovation Community of Practice virtually. The online platform is a virtual platform for conversations about experiences in civic innovation. The platform helps to assist other city agencies facing common issues. The office curates the Civiqueso, an online forum to document the city's design, technology, and innovation experiences. These online forums do not only connect the Agile practitioners among themselves to share their stories, but also provides the public platform for new practitioners to learn from the ongoing conversation.

## Establish Agile Management Support

In the adult phase, support structures for Agile management provide the institutional, technical, and contractual assistance for Agile projects. The institutional support systems help in routinizing Agile procedures. The technical support assists in enhance the organizational capacity for Agile. The contractual assistance enables the public agencies to work with vendors in iterative and incremental ways. Although these support structures could be established in any phase of Agile adoption, they are critical for maturing the Agile methods enterprise-wide.

Institutionally, Martin and Abdalsadek (2017) argue for an Agile Management Office, which is specialized in Agile project management. Such an office holds several advantages for enterprise-wide Agile implementation. First, the office can track team productivity and product delivery by applying lean estimation techniques. Second, it can foster collaboration between teams, ensuring that they are aligned. Third, it can ensure prioritization, whereby the features of highest value are delivered. Last, but not the least, the office could provide a lightweight form of governance focusing squarely on strategic vision at project level while allowing flexibility at the task level. Such institutional support helps state and local governments to establish procedural mechanisms for Agile implementation.

The technical experts bring capacity to help form cross-functional Agile teams, oversee the Agile techniques, and provide training as required. The specific technical expertise depends on the Agile methods that the state or local government seeks to develop. In Connecticut, the Office of Policy and Management focused on honing Lean methods, in the context of the state's long history with Lean experience. In California, the Project Management Office has focused on developing Agile playbooks, given the context of its evolution with various ways of managing IT projects. New York's Service Design Studio and Austin's Office of Design and Delivery have focused on user-centered design in the context of their service delivery.

Contractually, the support can help establish Agile acquisition methods. The support structures can help establish legal agreements for vendors and agencies, so that the contract vehicles do not have to be redesigned for new Agile projects. Vendors as well as agencies would then have demonstrated means of implementing Agile. The support structures can also customize the Agile contract vehicles suitable to their organizational context. In Connecticut, the LeanCT program got legislative backing for the Office of Policy and Management to contract for consulting services to apply Lean practices and principles to state agencies. The California Project Management Office customized the work order authorizations for Agile projects. New York's Service Design Studio and Austin's Office of Design and Delivery also established agreements for how agencies could implement user-centered design principles.

As the case experiences show, there are different forms of the support mechanisms. Connecticut established the support as a LeanCT program under the Office of Policy and Management. In California, the Project Management Office was established for broader project management, which has also been instrumental in enabling Agile methods. The two states have more recently established a digital service office for user-centered design in public facing services. New York's SDS and Austin's ODD also support user-centered design across departments. The innovation office in Austin helped establish ODD.

Thus, case studies show that the support mechanisms could be in the form of a program, a project management office, innovation office, and user-centered design. A few federal agencies (e.g., GSA and others) and state governments (e.g., Arizona, Maine) have also established Agile centers of excellence (CoEs) to foster its growth across the enterprise. The CoEs are technically oriented, providing specialized expertise and leadership in using Agile methods.

Whereas the case studies show centralized support structures, the support mechanisms could also be decentralized across the enterprise within large departments.

State and local governments can set up Agile management support structures at any stage of Agile adoption, but it is of critical significance in the adult phase to scale up and sustain Agile enterprise-wide. Government leaders who are committed to Agile envision the need for Agile support early on and create the organizational structure to support the use of Agile across departments. In the infant or adolescent stages, the support structures have the task of initiating Agile methods and getting the departments to become familiar with these methods. Much emphasis is put on training activities and consulting with the departments to undertake Agile projects. In the adult phase, the role of the support structures become broader to institutionalize Agile across departments. They would need to routinize procedures and set up contractual mechanisms for facilitating such implementation.

## Sustain Agile Organizational Culture

Conducting most projects in an Agile mode or having Agile institutional mechanisms are a part of reaching adulthood. However, Agile is not an end in itself, but a means toward different ends. Sustaining an Agile organizational culture requires considering Agile itself as being Agile. As Denning (2020) argues, Agile cannot be static. This implies that the Agile methods themselves must be open to examination and continuously contextualized. The central emphasis is on the characteristics of Agile—as a mindset, as an iterative and incremental framework, as a user-centric framework, and as a facilitated management with self-selected teams.

The people and their interactions matter more than the process or tools. The incremental approach allows for flexibility and adapting to change. Although there are various Agile concepts drawn from software development (e.g., scrum, Kanban, etc.), the methods need to be contextualized to the organization and evolve over time. There is no single way of sustaining Agile organizational cultures. They evolve in multiple ways, and they depend on context and history. The institutional structures for supporting Agile also evolve in this contextual history. These institutional structures help sustain Agile in the adult phase.

There are four dimensions of sustainability of Agile methods:

- **Top-level leadership** (e.g. governor or mayor) could provide the initial impetus for adopting Agile and the priorities of subsequent leaders influence how the methods are sustained. Middle level managers are crucial for sustaining Agile within the organizations at the team levels. Agile coaches act as servant leaders who can support the team efforts with technical and other assistance.
- **Legislative measures** provide legal backing for agencies to pursue Agile methods. The legislative actions often ensure that the methods are sustained despite top-level leadership changes. Legislation also helps in establishing the required institutional structures and funding for providing stable support.
- **Institutional structures** provide the necessary procedural and contractual support for conducting Agile projects. Once institutionalized, Agile becomes a routine way of undertaking projects, with the expertise distributed enterprise-wide.
- **Financial support** is crucial for the sustainability of Agile organizational culture. Stable financial support helps in the persistence of the institutional structures to sustain Agile methods across the government.

## Four Case Studies

The following case studies show how these dimensions have been peculiar to each state or local government, and how Agile has evolved in these governments.

**Connecticut** started with Lean, given its rich history of applying Lean methods in the private sector. The LeanCT program was legislated in 2013, building on the state's experience with implementing Lean. Lean has since become a critical part of Connecticut's management process and entrenched in the organizational culture. The state's agencies have to use Lean process improvement techniques to streamline their workflow before requesting funding from the IT Investment Fund for a technological solution. After the Connecticut Digital Services (CTDS) started in 2019, the state has also begun to focus on user-centered design for public facing services (e.g., for businesses, driving licenses). The state governors have played a key role in championing these Agile methods. The LeanCT program and CTDS are directly funded by the state government through budgetary allocations.

**California** legislated setting up of the Project Management Office in the context of the state's failures with large, complex, and costly projects. The PMO was designed to overcome the challenges due to the lack of experienced project management staff at the departmental level in the decentralized structure. Set up in 2016, the PMO aimed to focus on standardized frameworks, education, training, and tools and techniques. The PMO uses Agile as one of the frameworks for project management, and it has developed Agile playbooks. The office also provides project management services directly to the departments. Unlike the original legislative intent, however, the PMO has not undertaken large complex projects; it mainly deals with low-complexity projects.

**In New York City**, the Service Design Studio was set up within the Mayor's Office of Economic Opportunity. The NYC Opportunity was designed to advance Mayor de Blasio's goals to reduce poverty and increase equity. The office advances research, data and design to advance evidence-based programs, policies, and service delivery. The Service Design Studio (SDS) was set up in 2017 as a part of the NYC Opportunity to employ user-centric design approaches to make public services more accessible to New Yorkers. The SDS is innovative in its approaches, including its office hours, training workshops, Community Design Forum (a community of practice), and its service design guidebook. It is selective in choosing projects as the SDS team is small. However, the team is effective, and has received much critical acclaim. Moreover, the SDS's funding is through a grant from Citi Community Development, not from the city's budget. Hence, the stability of funding in subsequent administrations would likely influence the SDS's scope of work.

**In Austin**, the Office of Innovation was formally launched in 2014 after the city council approved its formation. The innovation office then helped establish the Design, Technology, and Innovation Fellows (DTI Fellows) program in 2016. The DTI team had expanded quickly and functioned on cost recovery model, whereby the team was funded through the departments with which it worked. The DTI became the Office of Design and Delivery (ODD) when it was integrated with the city's IT department in 2018. The innovation office and ODD have undertaken several projects in partnership with other departments where they have employed user-centric design principles. The institutionalization of the innovation office and the ODD is significant for sustenance of Agile. A commendable aspect of user-centric design in both New York and Austin is its application beyond software development. They have creatively used the design methods for social policy issues such as alleviating poverty and addressing homelessness.

# Future Research Agenda





As Agile methods continue to increase in adoption across government agencies, there are a few key strands of research agenda that require emphasis. There are both conceptual and empirical research questions that require further investigation. Answering the conceptual research questions would help in outlining Agile's relationship with other government reforms that have been underway over the past decades. Investigating the empirical research questions would assist in highlighting the relative strengths and weaknesses of Agile methods in comparison to other methods. In effect, the future research agenda should delineate the scope of Agile methods' application in government operations. In this vein, the following research questions are important threads that require examination.

## Conceptual Questions

1. **What are the public sector organizational reforms that Agile methods can bring about?** Although Agile methods originated in software development, its adoption in the public sector must transcend the technical roots and find applications for organizational management. Many public sector reforms have been raised in the last three decades (e.g., new public management, new public service, collaborative management, public engagement). If Agile methods have to transcend the technical roots, then it is important to consider the specific reforms that Agile can bring about in the public sector.
2. **What are the use cases of Agile's application in the public sector?** This question extends the first question on transcending Agile's technical application. While Agile is traditionally used in information technology departments, future research should address its applications to other departments in the public sector. The research needs to consider how Agile methods should be framed for such broader application.

3. **How should we conceptualize the success (or failure) of using Agile in public sector?**  
The typical metrics of success (or failure) of projects are the costs and the time taken to complete them. These are efficiency measures. Public sector projects are, however, complex and could be implemented over many years with changing goals. Efficiency measures may not be sufficient to indicate project achievements. A conceptualization of how to evaluate Agile projects would help in delineating the scope of Agile's application in the public sector.

## Empirical Questions

1. **What are the organizational conditions that help in adopting, implementing, and sustaining Agile?** As organizations evolve through the three stages (infant, adolescent, and adult) of Agile adoption, it is important to consider how organizations transition through these stages. The organizational conditions for Agile adoption during infancy, Agile implementation during all three stages, and sustaining during the adult phase could themselves be distinctive and require dynamic changes over time. The short- and long-term conditions that favor or hinder the growth of Agile within an organizational context require examination.
2. **How should Agile contracts be structured?** Agile contracts are distinctive from waterfall ones. While we know much about waterfall contracts, policies for Agile contracts are quite recent (some of which are modifications of existing waterfall practices). Since the experiences with implementing these Agile contracts are still emerging, we do not yet know about the important considerations to avoid pitfalls in the contract design. Research into Agile contract designs is important for the long-term success of Agile implementation.
3. **What are the leadership and team requirements for successful Agile implementation?** Present research on Agile leadership and teams are mainly from a perspective of software development. Since public sector agencies are not inherently designed for Agile, the adoption of such practice could have enterprise-wide impacts. As Agile's use becomes broader in the public sector, future research should examine the configurations of leadership and project teams for implementing Agile successfully.

The Agile Government Center (AGC), a new initiative of the National Academy of Public Administration, will no doubt play a key role in pursuing such research bringing together governments, nonprofits, foundations, academic institutions, and private sector partners to assist in the development and dissemination of agile government principles and case studies of agile policies and programs. The AGC has gained significant momentum with the creation of the Agile Government Network, which has developed a set of agile principles to drive government improvement. The network continues to develop case studies of agile government in action and acts as a source of assistance to those who want to adopt and implement Agile to provide public goods and services that fully meet customer needs and build public trust.



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