Using Innovation and Technology to Improve City Services

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IBM Center for
The Business of Government

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Foreword

On behalf of the IBM Center for The Business of Government, we are pleased to present this report, *Using Innovation and Technology to Improve City Services*, by Sherri Greenberg, University of Texas at Austin.

In this report, Professor Greenberg examines a dozen cities across the United States that have award-winning reputations for using innovation and technology to improve the services they provide to their residents. She explores a variety of success factors associated with effective service delivery at the local level, including:

Daniel J. Chenok

- The policies, platforms, and applications that cities use for different purposes, such as public engagement, streamlining the issuance of permits, and emergency response

- How cities can successfully partner with third parties, such as nonprofits, foundations, universities, and private businesses to improve service delivery using technology

- The types of business cases that can be presented to mayors and city councils to support various changes proposed by innovators in city government

Professor Greenberg identifies a series of trends that drive cities to undertake innovations, such as the increased use of mobile devices by residents. Based on cities' responses to these trends, she offers a set of findings and specific actions that city officials can act upon to create innovation agendas for their communities. Her report also presents case studies for each of the dozen cities in her review. These cases provide a real-world context, which will allow interested leaders in other cities to see how their own communities might approach similar innovation initiatives.
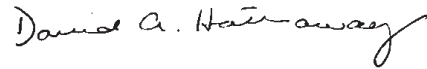
David Hathaway

This report builds on two other IBM Center reports: *A Guide for Making Innovation Offices Work,* by Rachel Burstein and Alissa Black, and *The Persistence of Innovation in Government: A Guide for Public Servants,* by Sandford Borins, which examines the use of awards to stimulate innovation in government.

We hope that government leaders who are interested in innovations using technology to improve services will benefit from the governance models and tools described in this report, as they consider how best to leverage innovation and technology initiatives to serve residents more effectively and efficiently.

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Executive Summary

Increasingly, cities are the public sector service delivery engines in the United States. They have heard a call to action: residents expect cities to find ways to improve services and cities are gearing up to do so. City governments, residents, and interest groups are actively seeking methods for better service delivery. This report examines how cities are using innovative policies, governance structures and technologies to improve city services.

Based on research conducted for this report, the author identified the following trends in local government:
- Cities are using new policies and governance structures to eliminate departmental silos and to include the public in policy making and implementation for better city service provision.

- Cities are using more inclusive governance structures to improve services.

- Cities are using digital and mobile technologies to improve city services.

- Cities are using numerous internal and external technology development methods.

- Cities are using technology as one method for improving service delivery by increasing public engagement and collaboration.

- Residents are now expecting transparency, accountability, collaboration, and civic engagement with technology from service providers, including easily accessible, exportable data sets with context.

- Many cities' constituents are now online and increasingly mobile.

The report presents five findings as to how cities are now implementing innovation and new technologies:
- Finding One: Cities need new governing structures for innovation.

- Finding Two: Cities need new funding and partnering arrangements.

- Finding Three: Cities are leveraging existing technology initiatives to make data more accessible.

- Finding Four: Cities are increasing public engagement.

- Finding Five: Cities are making performance data accessible.

- Finding Six: Cities are enhancing services to residents.

Based on the findings, the report offers six actions that cities can take to enhance their innovation capability:
- Action One: Look for targets of opportunity

- Action Two: Build capacity

- Action Three: Seek internal and external champions

- Action Four: Develop a compelling business case

- Action Five: Formalize new practices with concrete laws and strategies

- Action Six: Foster a culture of creativity and collaboration

Part II of the report culminates in case studies of the following 12 cities: Austin, Texas; Boston, Massachusetts; Chicago, Illinois; Kansas City, Missouri; Louisville, Kentucky; New York City, New York; Philadelphia, Pennsylvania; Riverside, California; Salt Lake City, Utah; San Francisco, California; Seattle, Washington; and Washington, D.C.

Part I

Introduction

"There's a real opportunity for the city of Boston to leverage tech to have a substantial, positive impact on the lives of the people of Boston. It's critically important that those experiences be good ones, so people walk away feeling like, 'Hey, I'm getting great service. My government actually gets what I need and it's helping me get there.'"[1]

Jascha Franklin-Hodge
Chief Information Officer, City of Boston

About this Study

Increasingly, cities are the public sector service delivery engines in the United States. They have heard a call to action: residents expect cities to find ways to improve services, and cities are gearing up to do so. City governments, residents, and interest groups are actively seeking methods for better service delivery. This report examines how cities are using innovative policies, governance structures, and technologies to improve city services. A list of case studies is presented on page 10. Additionally, the research undertaken for this report explores best practices and new tools.

The three primary methods for this research were:

- A literature review of relevant research and materials

- A review of cities' documents and technologies

- Interviews with city officials and partners

The research revealed that exemplary cities are not content with their existing service delivery levels or methods. Recent literature is rich with analyses and discussions of innovation, technology, and data in cities. This report examines specific actions that successful cities are taking to implement these innovations and technologies to improve services. The report answers the following questions:

- Which policies, platforms, and applications do cities use for different purposes?

- How do successful cities partner with private companies and nonprofit entities and universities?

- What is the business case for making these changes?

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1.   Colin Wood, "New Boston CIO Talks Open Data, Engagement and Access." (magazine article) (Folsom, California: *Government Technology,* July 2, 2014) Retrieved from www.govtech.com/local/New-Boston-CIO-Jascha-Franklin-Hodge-Talks-Open-Data-Engagment-Access.html

12 Case Study Cities

- Austin, Texas
- Boston, Massachusetts
- Chicago, Illinois
- Kansas City, Missouri
- Louisville, Kentucky
- New York City, New York

- Philadelphia, Pennsylvania
- Riverside, California
- Salt Lake City, Utah
- San Francisco, California
- Seattle, Washington
- Washington, D.C.

Trends in Innovation at the Local Level

Change is in the air in many city governments across the United States. According to McKinsey Global Institute research, 259 large U.S. cities (metropolitan areas with at least 150,000 people) generated almost 85 percent of U.S. gross domestic product (GDP) in 2010, and 80 percent of the U.S. population resides in large cities.[2] Bruce Katz, in *The Metropolitan Revolution*, contends that cities are taking charge due to federal dysfunction and limited state budgets.[3] Residents are asking cities to improve current services and provide new services and technology with greater efficiency and effectiveness. Mayors, council members, city managers, and staff are seeking collaborations across various city departments, and with residents, businesses, and advocacy groups.

Based on this research, the author identified the following seven trends in local government:

Trend One: Cities are using new policies and governance structures to eliminate departmental silos and to include the public in policy making and implementation for better city service provision. As Stephen Goldsmith and Susan Crawford write, "Bureaucratic structures must be upgraded to accommodate the new technologies and their uses."[4] Many of the new practices are just beginning as pilot programs or they are in the experimental stage. Not all of them will be successful but some already are seeing results. On the other hand, cities have various cultures and circumstances; hence, not every new technique can or should be replicated in all cites.

Trend Two: Cities are using more inclusive governance structures to improve services. Examples are occurring nationwide, ranging from Entrepreneur-In-Residence Programs in San Francisco to the Mayor's Challenge Cabinet in Kansas City to the CityWorks Academy in Austin. All of these programs bring constituents into city policy development through a formal process. Today, cities are partnering with nonprofits, businesses, and universities on new projects, programs, and funding. Additionally, they are developing new city staff roles, such as chief innovation officers and chief data officers, in an effort to eliminate city department silos. However, new partnerships and staff roles must not be a passing fad; there must be a sound business case for these new initiatives.

Trend Three: Cities are using digital and mobile technologies to improve city services. New technologies can facilitate coordination within city departments, foster better constituent input,

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2.   James Manyika, James Remes, Richard Dobbs, et al., *Urban America: U.S. Cities in the Global Economy.* (report) (New York City: McKinsey Global Institute, April 2014) Retrieved from www.mckinsey.com/insights/urbanization/us_cities_in_the_global_economy

3.   Bruce Katz and Jenifer Bradley, *The Metropolitan Revolution: How Cities and Metros Are Fixing Our Broken Politics and Fragile Economy.* (report) (Washington, D.C.: Brookings Institution Press, June 2013) Retrieved from www.metrorevolution.org/assets/TheMetropolitanRevolution-Forward_Introduction.pdf

4.   Stephen Goldsmith and Susan Crawford, *The Responsive City: Engaging Communities Through Data-Smart Governance* (San Francisco: Jossey-Bass, 2014) p. 2.

and fundamentally change service delivery. City governments use portals, websites, social media, and mobile applications with tablets and Smartphones. Every day, more open source platforms and tools become available to cities. Recently, some cities have built websites using open source architectures, such as Drupal and WordPress, and open data platforms, such as Socrata. The benefits for cities of using online and mobile platforms must outweigh the costs and city officials must make the business case for using new technologies. Cities also are using sensors for various challenges from pollution control to earthquake monitoring to traffic management. The Internet of Things (IOT) is on the rise, allowing cities increasingly to combine sensors, data and the Internet to improve services such as water conservation, energy efficiency, traffic management, and snow removal.

No one ever spoke of telegram government, or telephone government, or fax government. There is no e-government; there are government and people.

Technology is not a shiny new toy; it must be useful and improve people's lives and business dealings on either a daily or an as-needed basis. Cities can use these tools for better service delivery in areas as varied as health care, transportation, and permit issuance. However, cities must have the staff capacity and budgets for innovation and implementation.

Trend Four: Cities are using numerous internal and external technology development methods. Cities are using numerous digital and mobile platforms to improve service delivery. Cities' digital and mobile products must be useful to people in their daily lives. They must be accessible and support an economic, service, or social goal for the individual or entity that is engaging with the technology. As cities develop new technologies, usability from a resident's perspective, should be first and foremost. Successful city-level technologies include:

- 3-1-1 services (these services are described in more detail later in this report)

- Open data projects

- Hackathons (also described later in this report)

- Crowdsourcing

- Planning

- Virtual town halls

Trend Five: Cities are using technology as one method for improving service delivery by increasing public engagement and collaboration. However, increasing public engagement involves adding to, not subtracting from, current outreach activities. The traditional means of city government's public engagement—such as community input meetings and public hearings—remain necessary but are not sufficient. To achieve greater public engagement and improve services, cities must add new methods, including digital and mobile technologies. Truly improving service provision requires cities to reach beyond the "frequent flyers" who appear at most traditional public meetings and to engage larger segments of the community. As the saying goes, cities need to "make new friends but keep the old."

Traditional ➕ Digital ＝ Enhanced Public Engagement

Trend Six: Residents are now expecting transparency, accountability, collaboration, and civic engagement with technology from service providers, including easily accessible, exportable data sets with context. Open data portals must include visualization tools, catalogues, and explanations to be truly useful. Cities benefit from greater knowledge, collaboration, efficiencies, and consensus, and the public benefits from partnering and co-creating with city government during decision-making and implementation to provide better services.

Trend Seven: Many cities' constituents are now online and increasingly mobile. According to January 2014 Pew Research Center data, 90 percent of American adults have cell phones, 58 percent have Smartphones and 42 percent have tablets.[5] Additionally, as of May 2013, 63 percent of American adults used their cell phones to go online. Some demographic groups, such as young Latinos, frequently use Smartphones as their single means of communication. Furthermore, an April 2014 Pew Center Survey found that 59 percent of American seniors age 65 or older go online.[6] The Internet, Smartphones and tablets can bridge the digital divide and allow people who had been left out of traditional forms of public engagement to interact with their cities for better service delivery.

90% adults have cell phones	58% adults have Smartphones	42% adults have tablets
63% adults use cell phones to go online	59% seniors go online	
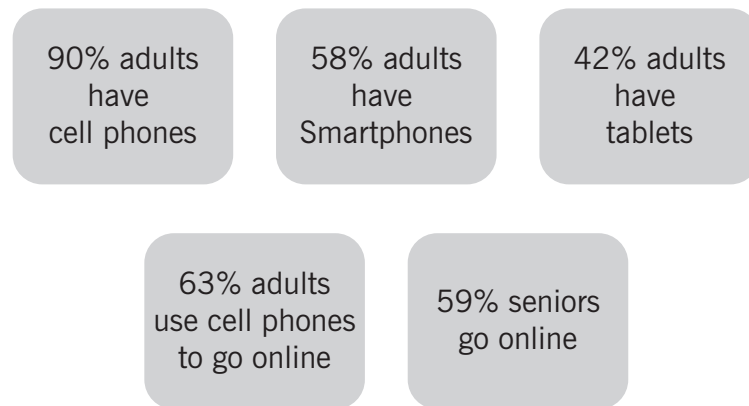
According to comScore, "May (2014) turned out to be a banner month for mobile, as it delivered on some huge milestones, which underscored just how impressive the medium's ascendance has been in the past few years. Mobile platforms—Smartphones and tablets—combined account for 60 percent of total digital media time spent, up from 50 percent a year ago. And perhaps more impressively, mobile apps accounted for more than half of all digital media time spent in May, coming in at 51 percent."[7]

5.   Pew Research Center, "Highlights of the Pew Internet Project's Research Related to Mobile Technology." (fact sheet) (Washington, D.C.: Pew Research Center, January 2014) Retrieved from www.pewinternet.org/fact-sheets/mobile-technology-fact-sheet/
6.   Aaron Smith, *Older Adults and Technology Use.* (report) (Washington, D.C.: Pew Research Center, April 3, 2014) Retrieved from www.pewinternet.org/2014/04/03/older-adults-and-technology-use/
7.   Andrew Lipsman, "Major Mobile Milestones in May: Apps Now Drive Half of All Time Spent on Digital." (blog post) (Reston, Virginia: comScore, June 25, 2014) Retrieved from www.comscore.com/Insights/Blog/Major-Mobile-Milestones-in-May-Apps-Now-Drive-Half-of-All-Time-Spent-on-Digital

Findings: Implementing Innovation and New Technologies

Finding One: Cities Need New Governing Structures for Innovation

Different roles and organizational structures emerge, depending on whether the city has a mayor-council or council-manager governance system. The cities examined in this study represent both of these governing structures. The council-manager form is more prevalent in the Midwest and Southwest United States and in growing cities. The mayor-council form tends to be more prevalent in cities with more than 250,000 people. In mayor-council cities, the mayor is the chief executive officer with executive sponsors typically located in the mayor's office. In council-manager cities, the city manager is the chief executive and the city council sets policy with the champions and silo busters reporting to the city manager. Both governance forms can produce successful innovation efforts in governance and technology implementation; the important point is having the support of top management and having skilled staff with authority to make necessary changes.

In some cities, innovation efforts reside in existing departments. In others, the information technology department is also the innovation office. Some cities have established specific offices to develop and implement innovation, public engagement, or data efforts, and in the city's organization chart, personnel in these offices may report directly to a mayor or city manager. Examples from case study cities include the:

- Austin City Manager's Innovation Office
- Mayor's Office of Civic and Community Engagement in Kansas City
- Mayor's Office of Data Analytics in New York City
- Mayor's Civic Innovation Office in San Francisco
- Mayor's Office of New Urban Mechanics in Boston
- Mayor's Office of New Urban Mechanics in Philadelphia

Many cities have created new staff roles, such as chief innovation officer, chief data officer, and technology engagement specialist. Some of these new staff members are in new departments or offices, some are part of existing structures, and some report directly to a mayor or city manager. Currently, at least 19 U.S. cities have an innovation officer and at least eight cities have a data officer or a similar title. The data position is the newest and appears to be expanding in cities. Although, recently some cities have combined the innovation officer with the chief information officer or chief technology officer. However, the title of the city staff position is not the important factor; rather the position's role, responsibilities, and authority are most important. In some cities, these formal roles, along with a cohort, provide part of the

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Staff Roles

3-1-1 Director: The 3-1-1 director determines what services to offer through 3-1-1, a special-purpose, local phone number, which connects individuals to nonemergency-based municipal services. Many 311 services now combine the phone number and online access with growing mobile access and performance tracking. (The 3-1-1 concept is described in more detail on page 23.)

Capital Improvement Program Officer: The capital improvement program officer is responsible for strategic planning, investment funds development, and coordination of major city improvement projects. Capital improvement project planning and implementation often incorporate strategic technology development.

Chief Data Officer, Data Architect, or Chief Digital Officer: The chief data officer (CDO), or similar title, is an emerging position, often reporting to the CIO or city manager or mayor. The CDO is responsible for database system planning, governance, data quality and standards, open data, and transparency. More than 12 U.S. cities have CDOs.

Chief Information Officer/Chief Technology Officer: The chief information officer (CIO) or the chief technology officer (CTO) serves as the director of a city's entire technology efforts, including planning and execution of: information systems, applications, networking and telecommunications, data storage and data center, user information technology support and service, governance, and special projects. Many U.S. cities now have a CIO.

Chief Innovation Officer: The chief innovation officer (CINO) is a new position, often reporting to the city manager or mayor. The CINO is responsible for generating and recognizing new ideas, and coordinating innovation efforts within the city and with the outside community. More than 15 U.S. cities have innovation officers.

Chief Resiliency Officer: The Rockefeller Foundation requires cities that receive funding from its 100 Resilient Cities Challenge to establish the chief resiliency officer position to help the city adapt and grow despite chronic stresses and shocks. The position often reports directly to the mayor or city manager.

Chief Sustainability Officer: The chief sustainability officer typically devises, coordinates, and implements environmental programs and other initiatives to make a city more livable and its residents healthier. The position often reports directly to the mayor or city manager.

Public Information Officer: The public information officer (PIO) conducts a city's external communications and media relations and can play a key role in developing a city's digital plan and social media. Many U.S. cities have a PIO who often reports to the city manager or mayor.

Planning Director: The planning director oversees city development and land planning initiatives. The planning director can play a key role in developing geographic information system (GIS) and digital applications, such as visualization and gaming, to engage residents in the city planning and permit-issuing process.

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infrastructure for governance innovation and for creating new digital and mobile access to city services. As noted by Rachel Burstein and Alissa Black in *A Guide for Making Innovation Offices Work,* these new roles are not the answer for all cities.[8] Some rely on existing staff and on direction from various internal and external champions and support from community organizations to spur innovation, technology, and better service delivery.

8.　Rachel Burstein and Alissa Black, *A Guide to Making Innovation Offices Work.* (report) (Washington, D.C.: IBM Center for the Business of Government, 2014) Retrieved from http://www.businessofgovernment.org/sites/default/files/A%20Guide%20for%20 Making%20Innovation%20Offices%20Work.pdf

Table 1: 12 Case Study Cities

City	Governance	Chief Innovation Officer	Chief Data Officer
Austin, Texas	Council-Manager	X	X
Boston, Massachusetts	Mayor-Council	X	X
Chicago, Illinois	Mayor-Council	X	X
Kansas City, Missouri	Council-Manager	X	
Louisville, Kentucky	Mayor-Council	X	
New York City, New York	Mayor-Council	X	X
Philadelphia, Pennsylvania	Mayor-Council	X	X
Riverside, California	Council-Manager	X	
Salt Lake City, Utah	Mayor-Council		
San Francisco, California	Mayor-Council	X	X
Seattle, Washington	Mayor-Council	X	
Washington, D.C.	Mayor-Council	X	X

Finding Two: Cities Need New Funding and Partnering Arrangements

Cities must develop, not only the personnel who can implement innovation and technology to improve services, but also a sustainability plan. The plan should identify funding and infrastructure and should be incorporated into the city's strategic planning.

New Funding Models

Some cities set aside money for innovation projects, incubation, and beta testing. Cities dedicate this funding to exploring options and management designates this funding for growing the city's technology and governance innovation capacities. In other cities, management does not designate specific funding; hence, innovation and technology efforts may be sporadic, conducted by city departments with outreach or technology funds in their existing budgets, or through contracts that use those funds. Cities also are experimenting with using city and neighborhood funding for specific projects, and with using online crowdfunding platforms for specific projects.

There are several funding models that support new technology and governance efforts. Three models are:

- **The department funding or department/partner funding model.** Through this model, management assesses the innovation or technology to be appropriate for more than one department. Then, each department determines the percentage of the cost that it will cover. This model has many benefits, including cost sharing, leveraging technology and service contracts, and perpetuating a consistent infrastructure.

- **The central planning funding model.** When a central planning department funds a project, it usually provides funding for a certain resource, expertise set, or resource center that the entire city organization can access. Typically, the city has tested the technology and has deemed it appropriate for the entire organization.

- **The partner/grant funding model.** Partnership and grant funding comes from a combination of fund matching, donations, and grant application activities with foundations, nonprofits, industry, and universities.

New Partnering Models

Nationwide, cities seeking to improve service delivery are partnering with a broad array of entities. Many of the case study cities have partnered with foundations and other nonprofits, universities, and start-up companies.

Foundation Partners

Numerous foundations are heavily involved in fostering innovation in cities. Case study cities are partnering with many foundations, including: the Bloomberg Philanthropies, the Kauffman Foundation, the Knight Foundation, the MacArthur Foundation, and the Rockefeller Foundation. Some foundations fund city initiatives nationwide while others are city-specific. Foundations now involved with cities include:

- **The Knight Foundation** has started the Knight Cities Challenge contest to identify innovative ideas that can make cities more successful in the areas of talent, engagement, and opportunity. Eligible cities are the 26 existing Knight Communities where brothers John S. and James L. Knight owned newspapers. The Knight Foundation selected the winners from the first round competition in January 2015. The case study city of Philadelphia is a Knight Community.

- **The Kauffman Foundation**, a large private foundation in Kansas City, supports entrepreneurial programs nationwide, including an annual Mayors' Conference on Entrepreneurship. Additionally, the Kauffman Foundation funds Kansas City education initiatives, and has a Kansas City Civic Team that supports and funds innovation efforts to make Kansas City a better place to live and work.

- **The Rockefeller 100 Resilient Cities** program selects cities through an application process to receive funding for resiliency efforts to combat physical, economic, and social challenges. To date, 67 cities worldwide have been recognized as resilient cities, including the case study cities of Boston, Chicago, New York, and San Francisco.

- **The Bloomberg Philanthropies** has several government innovation programs to drive innovation in cities, including funding the Mayor's Challenge and Innovation Teams for up to three years. The case study cities of Chicago and Philadelphia have won funding from the Mayor's Challenge that incentivizes cities to develop innovative policies to improve city life. Bloomberg Philanthropies has selected case study cities Boston, Chicago, Louisville, and Seattle to participate in the Innovation Teams program, which seeks to address pressing city problems with data, partnerships, and performance evaluation through the use of in-house innovation consultants.

- **Living Cities**, a collaboration of 22 large foundations and financial institutions, invests in cities to help them develop innovative approaches to improving the economic well being of low-income people. Living Cities, in cooperation with *GOVERNING* magazine, has initiated an Accelerator City program. The first three cities selected from the competitive process are Louisville, Nashville and Philadelphia.

Nonprofit Partners

In addition to foundations, many nonprofits are working closely with cities. These nonprofits include:

- **Code for America** builds open-source software for local governments and organizes people to address complex city challenges through several programs, including a fellowship program that sends technology teams to local governments for one year to partner with officials. The following case study cites have received Code for America Fellows: Austin, Boston, Chicago, Kansas City, Louisville, New York City, Philadelphia, San Francisco, and Seattle.

- **Fuse Corps** is an entity that partners with mayors and civic leaders to place mid-career professionals in cities for a 12-month Executive Fellowship to help with innovation efforts. The case study city of San Francisco has had a Fuse Corps placement.

- **EcoDistricts program** is a collaborative effort. The goal of EcoDistricts is to create sustainable cities from the neighborhood level up and participating cities receive tools and training for projects. The case study cities of Austin, Boston, Philadelphia, San Francisco, and Washington, D.C. are participating in the EcoDistricts program.

University Partners

Nationally, many universities work with cities and several have been particularly active in partnering with case study cities on innovation and technology projects to improve city services. Universities include:

- **Harvard's Ash Center for Democratic Governance and Innovation Project on Municipal Innovation,** in which the case study cities of Austin, Boston, Chicago, Kansas City, New York, Philadelphia, San Francisco, and Seattle are participating

- **The MIT Lab** works closely with Boston

- **GovLab** at New York University works with New York City

- **Other university partnerships** include:

  — University of Chicago works with Chicago

  — University of Philadelphia works with Philadelphia

Business Partners

Numerous start-up companies and established businesses are working closely with cities on innovative processes and technologies.

- **Socrata** works closely with many of the case study cities on their open data efforts.

- **Mindmixer** worked with Kansas City to develop KC Momentum to solicit community input on city services.

- **Connected Bits** worked with Boston to develop the Citizens Connect App for residents' online service requests and problem reporting.

- **newBrandAnalytics** partnered with Washington, D.C. to develop Grade DC, which allows residents to evaluate city services.

Finding Three: Cities are Leveraging Existing Technology Initiatives to Make Data More Accessible

Cities are Creating and Using Open Data

Open data projects involve publishing city data sets in accessible, exportable, online formats. The city provides this data for individuals, businesses, and community groups to improve city services and promote economic development. The data sets often include the following information:

- Geographic variables

- Chemical and environmental data

- Building construction data

- Health and economic indicators

- Information from the private and nonprofit sectors

Cities frequently provide data about city departments and functions to promote transparency and accountability.

Providing open data requires that the data be clean and accurate and be accompanied by data dictionaries. Visualization tools and application programming interfaces (APIs) help people understand and use the data to their greatest potential. Private companies and nonprofit organizations often link data they collect to city data to provide a better understanding of the city and to develop applications for public use and private profit.

Figure 1: Riverside Open Data

Source: riversideca.gov/transparency/data/dataset/list

Figure 2: New York City Open Data

Source: https://nycopendata.socrata.com/

Cities are Using Hackathons and Challenges

Hackathons are occurring in numerous cities and they involve participants from multiple sectors who assemble for 24 to 48 hours to mine data and develop code or technology to promote public engagement and improve city services. To conduct a hackathon, a city must provide accessible, exportable open data and many cities develop special open data sets for these events.

The most successful city hackathons jumpstart a project, provide focused work for an ongoing project, or "kick the tires" on an idea to see if it has traction. Typically, hackathons select winners by a vote of participants or a panel of judges.

Challenges are time-limited events in which cities use their constituents' expertise. Challenges usually involve a competitive process with a reward for the best or most usable solution to the challenge. Examples of challenges include digital expert panels who answer a science-based question, the development of a logo for an event, or recruitment of local expertise to fulfill an emerging or urgent need.

Figure 3: New York City Hackathon

Source: nycbigapps.com/

Figure 4: Boston Hackathon

Source: http://hubhacks.challengepost.com/

Finding Four: Cities are Increasing Public Engagement

Cities are Using Crowdsourcing and Crowdfunding

Crowdsourcing is the process of acquiring needed services, expertise, ideas, or funding by soliciting contributions from an online community. Cities also use crowdsourcing to collect information about a topic, such as solutions for information needs, ideas for addressing pressing community questions, or getting input on policies or procedures. Crowdsourcing methods vary from Facebook and Twitter input to specialty software, such as IdeaScale, through which formal discussions are held online about specific policy or management questions.

Figure 5: Philadelphia Crowdsourcing
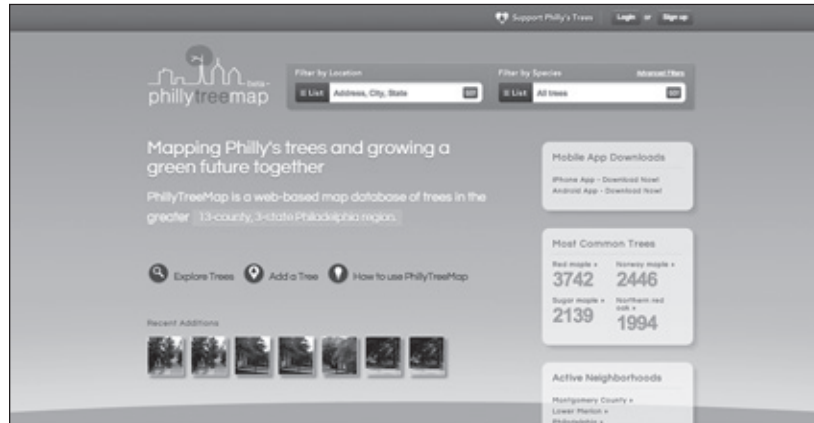
Source: https://www.opentreemap.org/phillytreemap/map/ (previously phillytreemap.org/)

Figure 6: Boston Crowdsourcing
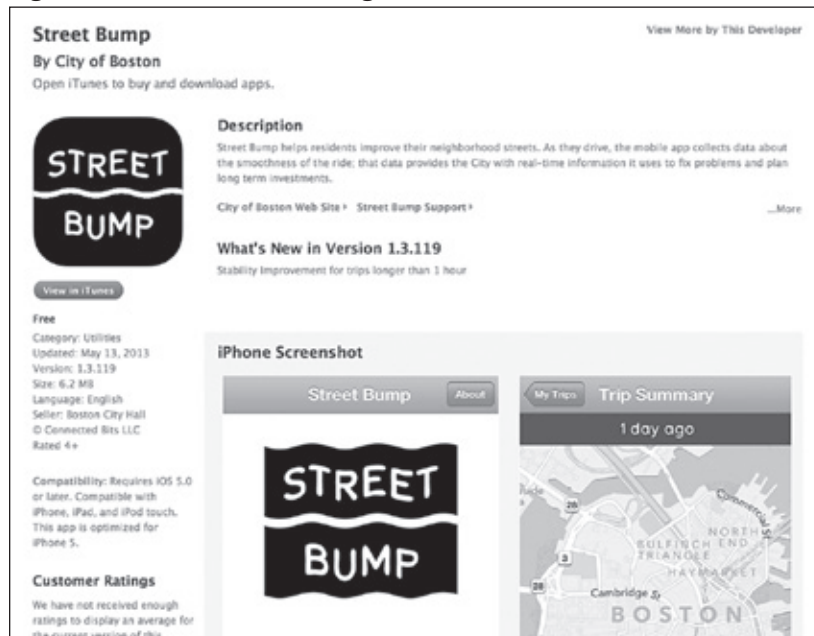
Source: www.cityofboston.gov/doit/apps/streetbump.asp

Crowdfunding works similarly to crowdsourcing. Cities use online tools to request community-provided monetary support for an event or project. Crowdfunding initiatives often incorporate challenges to create competition among community groups and public-private entities. Cities typically decide what to crowdfund based on budgets, but also on residents' requests.

Crowdfunding can be a community development and participation exercise. By giving time and/or money to an event or project, community members participate in the community growth process. The main users of crowdfunding are larger cities, which have used it primarily for park and garden projects.

Philadelphia was the first U.S. city to use Citizinvestor, which is geared specifically to help municipalities acquire funding to complete their projects. The City Council of New York City has used Kickstarter to fund projects in low-income neighborhoods. Cities use these crowdfunding tools to post a project with a funding goal and people donate online.

Figure 7: Philadelphia Crowdfunding

Source: http://www.phila.gov/commerce/Documents/Kiva%20Zip%20Flyer.pdf

Figure 8: New York City Kickstarter

Source: https://www.kickstarter.com/pages/NYC

Finding Five: Cities Are Making Performance Data Accessible

Many Cities Are Using Performance Tracking

To evaluate and improve efficiency and effectiveness, some cities are using data tracking and management tools, such as CitiStat, or other approaches, to track a numerous performance indicators. Complimenting the software is a city philosophy that management and policy making can be data driven. Several case study cities have adopted the CitiStat model. Working with a private sector partner, Washington, D.C. developed Grade.DC.Gov, which allows residents to grade city services and view how others graded them. This data helps inform cities' decision-making processes. Data collection variables often include: response time, overtime, sick leave, trash collection, and snow removal. Also, frequently the data addresses the prevalence of problems such as illegal dumping, flooding, vacant buildings, and sewage overflows. The tools compile the information in databases and analyze it with the assistance of geographic mapping to identify areas of underperformaning areas.

Figure 9: Kansas City CitiStat

Source: https://kcstat.kcmo.org/
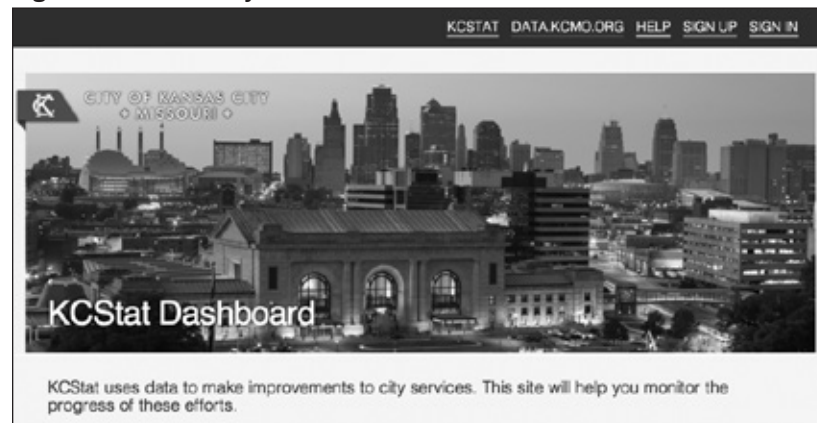
Figure 10: Washington, D.C. Performance

Source: grade.dc.gov/

More Cities are Using 3-1-1

3-1-1 is a special purpose local phone number that connects individuals to nonemergency-based municipal services. Increasingly, residents can access the phone number via the Internet and mobile devices, gaining digital and mobile access to city services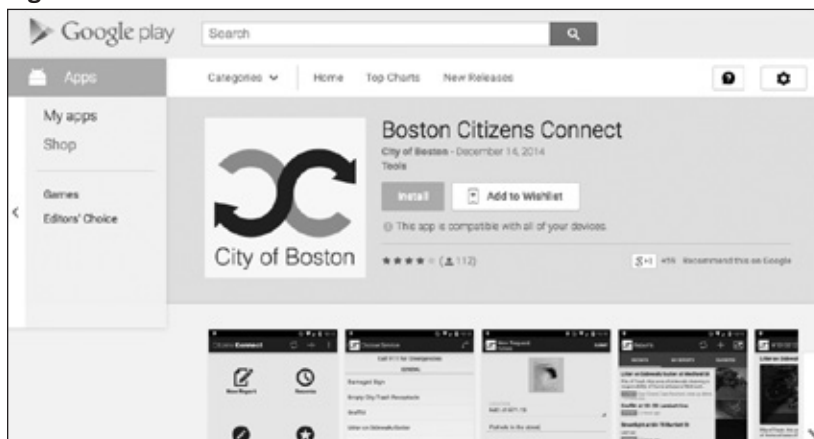. Cities offer numerous 3-1-1 services, ranging from noise complaints, to reporting stolen vehicles, to pothole fix requests, and many more. 3-1-1 is available in more than 30 cities nationwide, and has a growing presence. Now, cities are using various applications to enhance 3-1-1 services, including online and mobile technologies that they purchase from vendors or develop internally. With mobile apps residents can report, photograph, map, and anonymously submit information on graffiti, potholes, animal carcasses, flooding, and other issues. The goal of 3-1-1 is to actively engage constituents in monitoring and improving the city.

Several case study cities, including Austin, Boston, Chicago, Louisville, Philadelphia, and Washington, D.C., have a 3-1-1 mobile app that residents can use. In October 2014, New York City, Chicago, Philadelphia, Denver, Baltimore, Charlotte, and Mecklenburg County, N.C., began a 3-1-1 partnership, the National 311 Executive Council, which serves as a repository for 3-1-1 data, and as a means of collaborating on developing best 3-1-1 practices, standards, and policies (http://www.govtech.com/local/6-Cities-and-County-Share-311-Data-Best-Practices.html).

Figure 11: Boston Citizens Connect

Source: https://play.google.com/store/apps/details?id=gov.cityofboston.citizensconnect

Figure 12: Louisville Metrocall 3-1-1

Source: http://louisvilleky.gov/government/metrocall-311

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Public Safety Agencies Are Making Performance Data Accessible

Numerous city departments have developed databases and mobile apps for tracking and reporting activities. For example, many city police departments offer alerting and reporting functions. Cities frequently combine them with reporting mechanisms for law enforcement to record incidence reports and response times. They often also offer mapping and real-time event tracking to keep residents apprised of emergency situations, such as progress of snow plowing.

Figure 13: Seattle Crime Reporting

Source: http://web6.seattle.gov/mnm/policereports.aspx/policereports.aspx
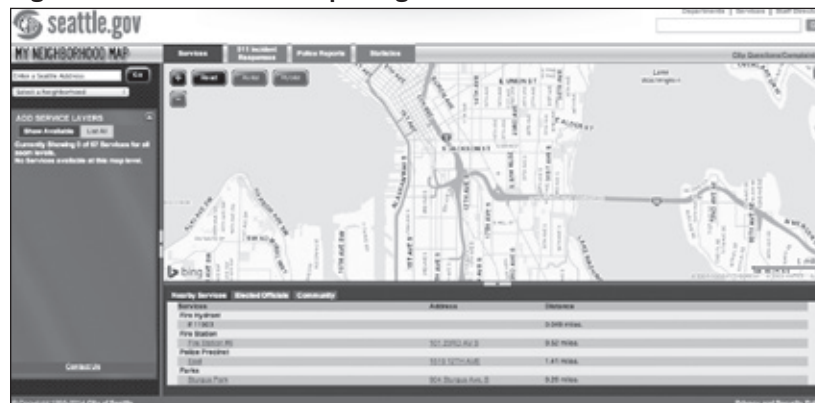
Figure 14: Chicago Snow Plow Tracker

Source: http://www.cityofchicago.org/city/en/depts/mayor/iframe/plow_tracker.html

Finding Six: Cities are Enhancing Services to Residents

Sustainable City Initiatives Are Increasing

Various cities now have major city environmental sustainability efforts involving projects such as encouraging recycling, solar energy development, and walking. To promote residents' participation in city environmental sustainability efforts, cities have developed apps for tracking energy, water, land, and municipal facility use, parking and transportation activity, and recycling and conservation efforts. Through the apps, residents are able to track their own activity, map activity across the city, and engage in and promote awareness and activism for sustainability. They also are able to submit ideas to city management and communicate how to better sustain the city environment.

Figure 15: Austin Sustainability

Source: austintexas.gov/department/rethink-mobile-app

Figure 16: Salt Lake City Sustainability
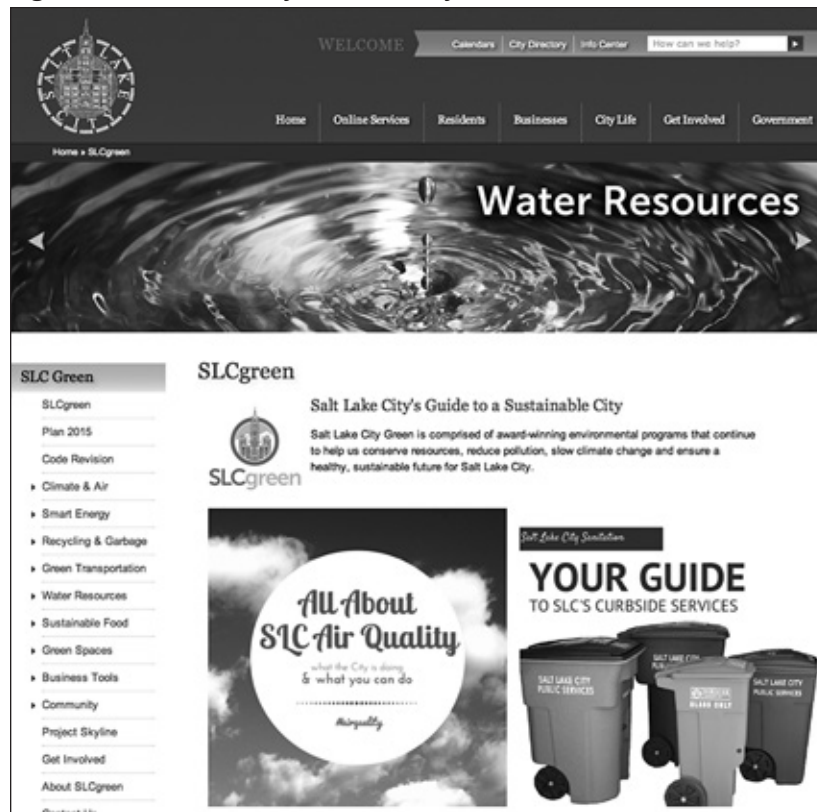
Source: www.slcgov.com/slcgreen

Transportation Information Is Now More Available

As part of promoting city sustainability and usability, cities use online and mobile applications to improve numerous transportation services, including car parking, bike sharing, and other transportation-related services. Apps include the ability to map routes, track times of arrival and departure, identify costs and basic information, and locate and share transportation services. Residents also are able to offer the city feedback about their transportation desires.

Figure 17: San Francisco Transportation
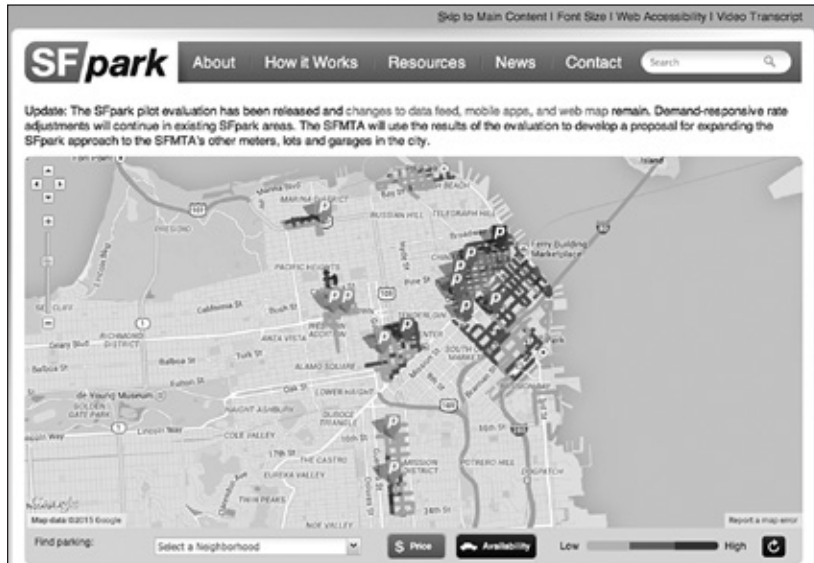
Source: sfpark.org/

Figure 18: Washington, D.C. Capital Bikeshare

Source: www.capitalbikeshare.com/

Cities Are Making Permit Issuance Easier

Nationwide, residents often voice frustration with complicated and lengthy permitting pro-
cesses. Permits can range from home renovation to constructing new buildings. Methods for
digital and mobile access to permit approval in cities are in flux. Currently, many cities are
trying to improve service provision and efficiency and decrease the time involved in granting
permit approval. Cities are turning to digital technologies to try to increase constituent satis-
faction with the permit-issuing process. These apps include the ability to identify, apply for,
and track various types of permits. They also provide detailed information about the permits
and the timelines and fees involved in obtaining them. They frequently offer the user electronic
documentation of the permit.

Figure 19: San Francisco Permit Information

Source: http://businessportal.sfgov.org/

Figure 20: Boston Permit Information

Source: http://permits.boston.gov/details.html

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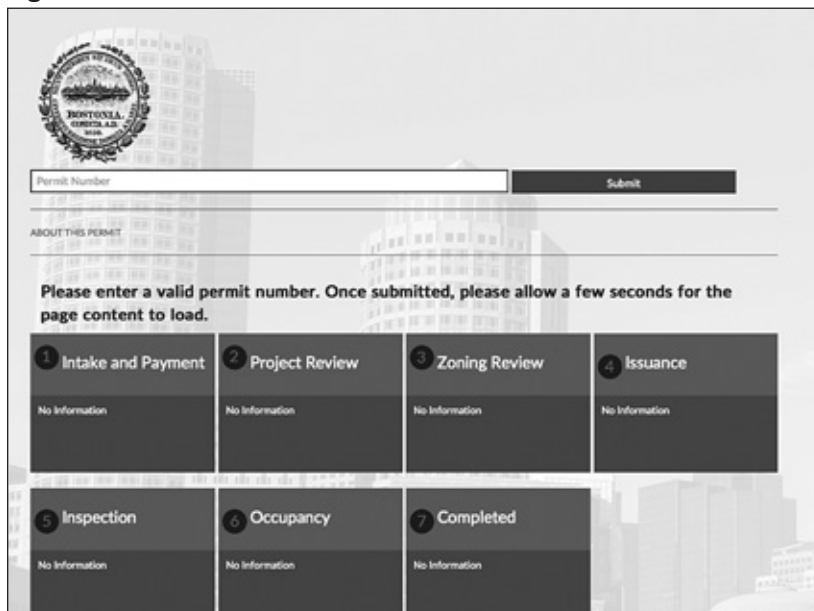
Residents Are Participating in City Land Planning and Capital Improvements Planning

City land planning and capital improvement development are active areas for digital and mobile development—whether a city is fast growing or undergoing major redevelopment. Planning and capital improvements always have been core city management functions that require significant public engagement to ascertain the community's desires for the city's shape and form. Constituents can have very divergent views on such issues and achieving consensus can be difficult. Cities spend enormous time and resources devising comprehensive development plans and capital improvement plans and constructing capital improvement projects. Today, cities must link capital improvement and land planning with sustained public engagement to choose projects and locations and to provide desired services. Cities are starting to use new digital and mobile technologies to spur greater public engagement in land and capital project planning.

Figure 21: Chicago Planning

Source: https://itunes.apple.com/us/app/kedzie-corridor/id742920997?mt=8
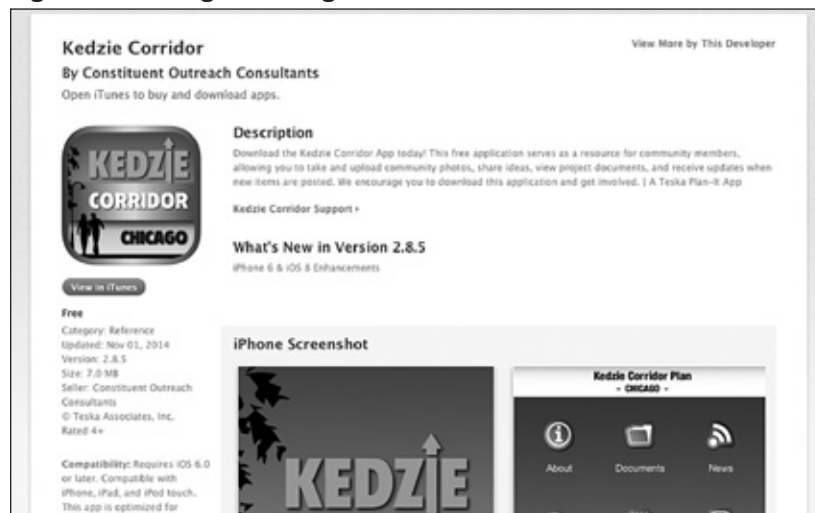
Figure 22: Austin Capital Improvements

Source: austintexas.gov/civic

Actions Cities Take to Promote Innovation in City Services

Six actions emerged for implementing innovation and technology to improve service delivery from the research conducted on the 12 case study cities. All of these cities use a combination of some of the actions discussed below.

Action One: Look for Targets of Opportunity

The first action is to continuously look for targets of opportunity for potential innovation in service delivery. A specific opportunity can be a spark that ignites new policies, management practices, and technologies. A target of opportunity can be the successful implementation of a project for proof of concept. The process then becomes iterative, with other staff, departments, and the community experimenting with new governance, collaborations, and digital and mobile solutions to enhance services.

A target of opportunity also can be an event or a project that ignites an innovation spark and galvanizes the city and the community. It can be a catalyst in the course of development that takes the project to the next level, introduces it to a new audience, or refreshes something that already exists. This can be an opportunity to test the use of a new program, policy, or technology application in a broad format. In some cities, strategic plans, open data plans, directives, or legislation have served as targets of opportunity. New technology applications have been catalysts in some cities.

Targets of opportunity can involve use or development of technology that leads to increased public awareness of and excitement for this new advancement. Often, successful civic technology development occurs in the community commons. Inviting constituents to participate in events that build and explore technology can assist in technology development and can help ensure the new technology's usability.

Examples of Targets of Opportunity
External events and award competitions often focus on and promote development of new technology and governance and engagement methods. Examples include applying for a grant, receiving a formal award, and presenting at major conferences. Competing for awards prompts cities to think creatively about how to develop technology for the community and how to involve residents, including nontraditional participants, in that development. Awards, such as the Intelligent Community of the Year Award sponsored by Intelligence Community Forum (ICF), can provide expertise and knowledge sharing, and they can play a significant role in spurring cities to partner with the community and innovate, using digital and mobile technologies. Riverside and Austin used the opportunity to apply for an Intelligent City Award to develop their core municipal technology infrastructures. Both cities were in the top 21 cities that competed for the award in 2012.

Hackathons, challenges, large-format gaming events, and real-time public technology launches are increasingly in use. The goal of hackathons, contests, and challenges are to bring together city staff and the community to collaborate, using city data, to devise apps and digital technologies that improve city services. Many case study cities sponsor hackathons to engage the public in using technology to improve city service delivery. Hackathons are labor-intensive, time-limited, one-to-two-day events. Participants use coding expertise, familiarity with the city and its functions, and industry or subject-matter knowledge to create a data or technology product, from idea to outcome: ready for testing on a pilot audience. San Francisco, Boston, and other cities participate in numerous hackathons throughout the year. Frequently, the hackathons occur in conjunction with Sunlight Lab's Apps for America annual development contest and the National Day of Civic Hacking.

Several case study cities, including Austin and Philadelphia, have participated in GIS Day, an international day during which geographical information systems (GIS) users demonstrate real world GIS applications. Challenges are competitions that engage the public in using technology and innovation to solve city problems and improve service delivery. New York City held its BIGAPPS NYC 2014 challenge from May to July 2014, during which 100 teams participated in developing apps for the city. In September, a panel of judges selected the top four winning teams from 20 finalist teams. The four winning teams received $20,000 per team and mentoring by experts. Also, the BIGAPPS challenge awards $5,000 per team to five teams in product categories, and awards BigIdea and in-kind prizes.

Open data is another opportunity for constituents to engage in development with a city. Residents can access data about the city, promoting transparency and knowledge, and they can use the data to improve their own business or interaction with the city. Open city data often provides a platform for innovation. Constituents and organizations can use the data to launch apps, connect with larger data sets, provide visualizations and maps for services, and expand the city's knowledge base.

Nationwide, more than 30 cities have some type of open data policy, such as a mayoral executive order, a city council resolution, or a city council ordinance. In some case study cities, including Chicago, New York, San Francisco, Washington, D.C., and Boston, open data policies have been the catalysts for new policies and positions, spurring digital and mobile technology development to improve services. In other cities, such as Austin, Kansas City, and Riverside, new websites have been the catalysts for open data portals, allowing for internal and external technology development to improve service delivery. New technology applications also have been a catalyst in several cities. Philadelphia was the first to use *Textizen*, developed with Code for America and entrepreneurs, enabling residents to text feedback regarding the city's ongoing comprehensive plan, Philadelphia 2035. Boston developed *Street Bump*, allowing residents to report potholes via an app that picks up vibrations while driving.

Action Two: Build Capacity

Cities need the technical, policy, and management skills to create and implement new policies, governance structures, and applications to provide better city services. Additionally, staff must have the ability to work creatively and collaboratively across city departments and with people from the community.

To build internal capacity, cities create cross-departmental and cross-functional staff teams. A primary role for staff working on innovation is silo busting—working to gather, build, and implement ideas across departments and functions. Often, new staff provides templates

and best practices, and the staff frequently serves as the resource center and coordinator for new policies, governance, and technology development. Also, new staff may provide process and strategy advice, technical skills, and mentorship. In various cities, staff is implementing innovative business methods, such as Design Thinking, and Agile and Lean processes.

In addition to building capacity within the organization, another effort includes seeking external partners to combine physical resources, funding, and services to support idea generation and implementation. Physical resources include broadband infrastructure, incubators, testing environments, and partner support to accompany new technology, forms of engagement, and governance structures. Partner support often combines academic, private, nonprofit, and public personnel expertise with monetary, equipment, and space resources. Also, partner support entails bringing in nontraditional participants to understand their ideas, and to understand how they may contribute to developing new processes, and technology applications.

Examples of Building Capacity

Cities that are the most adept at new programs, such as digital and mobile service development, typically have capacity that includes external actors. Best practice cities not only collaborate internally across city departments, but also partner externally with constituents and organizations. Additionally, they partner with each other and with universities, nonprofit organizations, and industry. Capacity building includes developing alliances with the following partners: businesses, foundations, universities, nonprofits, and media. These alliances can serve as a multidisciplinary team with city, technology, and business expertise that develops new partnerships and digital and mobile applications to engage diverse groups in city service delivery.

New Urban Mechanics is a unique collaboration between civic innovation teams in Philadelphia and Boston, universities, and foundations**.** In both cities, the Mayors' Offices of New Urban Mechanics provide a space where the private and public sectors and academics can partner to develop and incubate ideas and services that enhance cities. Hence, the initiative includes staff from Boston and Philadelphia, as well as individuals from the private sector and universities.

Various sources, such as city budgets, universities, industry, and foundations, have provided funding to enhance capacity building. Internal city departments and external entrepreneurs and academics pilot projects that address residents' needs. They focus on a broad range of areas; from increasing civic participation, to improving city streets, to boosting educational outcomes. The projects range from better-designed garbage cans to high-tech apps for smart phones.

Action Three: Seek Internal and External Champions

Successful cities find champions both inside city government and outside in the community. This creates a push from two directions. Inside the city, authorized officials must promote the implementation of new governance structures, policies, and digital and mobile applications to improve services. Simultaneously, constituents in the community—from individual residents to nonprofits, companies, and technology brigades—must push for the new policies, management structures, and digital and mobile technologies to enhance service provision.

Open Government and Open Data Ordinances, Resolutions, and Executive Orders

- **Austin, Texas:** In December 2011, the Austin City Council adopted the Open Data Resolution. The resolution calls for online, open government, and it recognizes the importance of transparency, efficiency and collaboration. Austin does not have an open data implementation strategy, but an internal governance team is developing a citywide open government directive.

- **Boston, Massachusetts:** In April 2014, Boston Mayor Martin Walsh issued an "Executive Order Relative to Open Data and Protected Data Sharing." The order encourages the city to continue to practice open government, and it calls for transparency and government engagement with the public. It also instructs Boston's chief information officer to issue a city open data policy.

- **Chicago, Illinois:** Former mayor Richard Daly began opening up Chicago's data in 2010, and in 2012, Mayor Rahm Emanuel issued an "Open Data Executive Order." The order requires the Department of Innovation and Technology to work with other city agencies on expanding public access to information, and it establishes an open data coordinator in each agency who must participate in the City's Open Data Advisory Group.

- **Kansas City, Missouri:** In May 2014, Kansas City Mayor Sly James and the city council passed a resolution declaring their support for open data of public information for Kansas City and directing the city manager to create and implement an open data policy. The resolution also requires the city manager to submit an annual open data report.

- **Louisville, Kentucky:** In October 2013, Louisville Mayor Greg Fisher issued an executive order creating an open data plan, including an open data management team, and a department open data catalogue. The order is particularly noteworthy because it considers public information to be open by default, and it calls for proactively publishing data. In November 2014, Louisville launched a new website with an open data portal.

- **Philadelphia, Pennsylvania:** In September 2012, Mayor Michael Nutter issued an executive order, "Open Data and Government Transparency." The executive order establishes an internal open data working group to focus on transparency, accountability, participation, and collaboration, and it requires Philadelphia to hire a chief data officer. It also requires the formation of a data governance advisory board, an open government plan, an open data policy, and a social media policy.

- **Salt Lake City, Utah:** In January 2009, Salt Lake City launched its "Greater Transparency for Collaborative Government Initiative" (later renamed the "Open Government Initiative"). Subsequently, the mayor and the city council adopted open government policies, and in June, 2010 the city launched "Open City Hall," an online forum for city engagement.

- **San Francisco, California:** Former mayor Gavin Newsom issued an open data executive directive in 2009. San Francisco was one of only three cities that enacted an open data policy prior to the federal Open Government Directive. San Francisco enhanced open data policy three times in 2010, 2013, and 2014 In 2013, the City passed the "Citywide Coordination of Open Data Policy and Procedures" legislation, creating the chief data officer role and data coordinators in each department.

- **Washington, D.C.:** Washington, D.C. began releasing open data in 2006 with a memo from the city administrator. In 2011, former mayor Vincent Gray issued a "Transparency and Open Government Policy Memorandum" directing staff to develop recommendations on improving transparency, participation, and collaboration. A 2014 order, the "Transparency, Open Government and Open Data Directive," includes an open government web portal, an open data policy, and a chief data officer.

Examples of Internal and External Champions

The internal champion is a person who has the passion, drive, and capacity to identify or create an innovative process or new technology. This person could be a mayor or the city manager, a passionate employee, a dedicated volunteer, a city commission member, or a city council member. Also, multiple people, or groups of people, can serve as champions. A champion is particularly important to start and implement a new form of engagement. Staff must support the champion to promote adoption and ensure sustainability of the project.

If the champion is a group, then the group must support the idea and the implementation. Frequently, champions appear because they communicate good ideas, but they are not necessarily able to implement those ideas. A successful champion, or champion group, must have both the idea and the capacity to implement. Champions must bust silos and put their resources and authority behind projects. They also must position the proposed projects high on their agendas through both words and deeds.

External champions are well regarded in the community and have ideas that they are willing to execute on behalf of the city and its residents. The external champion can be a civic-minded individual with a passion for technology or governance and the ability to combine community and technical knowledge for better city service provision. Frequently, the individual has experienced or identified a difficulty in obtaining services and has a productive idea to improve service access. When champions come from outside the organization, they must arrive with open minds and with skills to complement their passion and energy. It also is helpful if they come with suggestions regarding the resources that they will require from the city and constituents.

Working with a champion has the greatest effect when resources and passion are equally paired. The champion relationship also works better when communication lines are clear and open. Participants must keep a positive attitude about the project, and use the unique knowledge from each project member to improve service provision.

Mayors can serve as champions. These include the efforts of mayors in strong mayor cities, such as New York City, Boston, Philadelphia, and Chicago. In all of these cities, mayors were instrumental in championing innovative governance and new technologies to improve service delivery.

Staff members can serve as champions. In several of the case study cities, staff were champions. In Kansas City, the innovation officer was one of the champions and, in Washington, D.C., the deputy mayor for planning and economic development was one of the champions.

Civic technology groups can serve as champions. Many of the case study cities have been Code for America Partner cities, and most of them have Code for America Brigades.[9] The brigades are groups of residents in cities who self-organize to collaborate with their city governments on technology issues and projects to improve their cities. The residents have a variety of technical and nontechnical skills. They hold civic hack nights, advocate for open data, and deploy apps in their cities. To become an official Code for American Brigade, residents must be willing to follow specific Code for America policies and procedures. Also, many of the case study cities have support from other civic technology and civic innovation community organizations, such as Smart Chicago, sf.citi in San Francisco, Venture Café in Boston, and Open Access PHL in Philadelphia.

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9. Code for America builds open source technology and organizes people to improve the provision of government services; http://www.codeforamerica.org.

Action Four: Develop a Compelling Business Case

There must be a sound business case for internal use and promotion of a new technology or process. Important questions are:

- How will the new technology or process promote city efficiency and effectiveness?

- What benefit will a new policy or digital and mobile access provide to the internal structure of the city?

Internal technology and new process wins provide staff with access to services that support them as individuals and as employees. These services include access to employee information, pay and banking alternatives, mobile work apps and interfaces, and technology options that simplify and streamline employee and employee-constituent interaction.

To build the external business case for incorporating new governance models and digital and mobile service provision, many cities focus on business and economic development aspects that incorporate new access methods. Also, cities' open data has provided business entrepreneurs with numerous opportunities, ranging from building apps to building platforms that cities use. They consider how making the city more accessible and usable will contribute to and support the business environment. Additionally, the external business case frequently involves making city government more accessible to residents via digital or mobile engagement or services such as a virtual town hall meetings or paying fines.

Examples of Developing a Compelling Business Case

The business case needs to include benefits to the city and to the constituents. Cities often involve their Chambers of Commerce and business development organizations in governance and technology discussions. Also, numerous cities actively pursue technology that will support development and growth. Many of the activities associated with making the external business case for technology development include planning and envisioning the city of the future. Chicago's Chief Technology Office uses open data as an economic development driver. More and more cities are partnering with local startups; examples include online community conversation and social networks such as Kansas City's MindMixer and Nextdoor and Neighborland in San Francisco.

Cities need to get constituent feedback and measure performance of service provision. Several case study cities, including Kansas City and Louisville, have adopted the CitiStat model, which focuses on collecting data about the services offered by the city and using that data to track and improve city services. Cities can use this approach to identify, analyze and monitor metrics and performance indicators that are set in accordance with the cities priorities. Some cities monitor information and results of analysis are available through a performance dashboard. In other cities, residents are able to view and comment on goals, activities, tracking, and analysis of performance. Cities using a CitiStat model have reported major service provision improvements.

Action Five: Formalize New Practices with Concrete Laws and Strategies

Cities need to institutionalize new policies, management practices, and technologies in a concrete manner to provide better constituent services. This can take many forms including:

- Widespread adoption across city functions

- City council ordinance or resolution

- New staff positions

- Strategy documents and guidelines

- Adoption of digital and mobile technologies and applications

Eventually, the new management practice or technology must become part of regular city public engagement and outreach to improve service delivery. New governance structures and digital and mobile public engagement and service must be built into ordinances, resolutions, executive orders, strategic plans, and other efforts. The new forms of engagement must be formally adopted via citywide plans and strategies with evaluation. Furthermore, cities must identify and develop new funding streams and mechanisms to support new city technology, infrastructure, and programs. The new process or digital and mobile experience must be incorporated into everyday city life.

A significant indicator of a shift in how a city thinks about and uses new technology and processes is the extent to which they trigger an actual change in the city's digital infrastructure. Citizen-engaged design is emerging as the main information systems infrastructure underpinning city information technology. This citizen-engaged design model includes core changes to the city information architecture structure that allows digital and mobile engagement to become part of the execution of city administrative and resident services. Digital and mobile engagement methods are built into every appropriate city service. This includes the opportunity to:

- Conduct service acquisition and maintenance digitally

- Offer and receive online and mobile feedback

- Engage in democratic practices

- Collect and report data automatically

- Use real-time analytics

Examples of Formalizing New Practices

Cities can use new governance structures and digital and mobile platforms to ask for direct feedback. Some cities use technologies, such as IdeaScale and MindMixer, to gather constituent feedback. These technologies provide community discussion platforms with question-and-answer sessions, rating capacities, and constituent connection activities. Other cities have specific outreach efforts to engage the community and institutionalize innovative governance practices and digital and mobile engagement to improve service delivery. This can take the form of training, events, or specific technology applications.

To maintain and sustain information technology access and participation, cities often develop broad policies that are not device- or system-specific. For instance, there is an emerging expectation that constituents, employees, and partners will use multiple and varied devices. Rather than making device- or occasion-specific policies, cities develop a series of guiding principles for technologies. To encourage new governance structures and policies, some cities formalize interactions with constituents and businesses. Cities are forming entrepreneur-in-residence programs, citizen academies and other official groups to sustain concrete input and collaborations with various parts of the community.

Many cities develop strategic plans as one way to formalize new practices. Cities have produced concrete strategic plans including, topics such as information architecture, platforms and data, and discussions about transparency, engagement, accountability, effective governance, and evaluation. Cities focus on various ways of achieving success. Some are developing staff

capability; others are experimenting with innovative projects and some are formalizing policies and strategic plans. Improving service provision tends to begin as an iterative process, with cities experimenting with new technologies, policies, and management practices that mature into a strategic process.

To sustain service provision and technology development, cities must evaluate their progress. From the outset, cities must have defined outcomes that are measured with metrics and systems for tracking them. Cities use various methods to evaluate the successes and weakness of digital and mobile service delivery. Typically, they implement anonymous back-end user tracking with digital and mobile applications. Also, exemplary cities use various performance systems with metrics to analyze and track service provision.

The case study cities undertook major initiatives to combine and synthesize data across sectors to better understand constituents and deploy services more effectively. Some cities combined government data from multiple sources with private sector data in novel ways to reveal new relationships. For example, cities are enhancing public safety and emergency response capabilities with real-time analysis of aerial, fixed, and mobile data from various sources in numerous formats. They use big data and predictive analytics to improve planning and service delivery, from fire fighting in New York City to health care in Chicago. As noted by Stephen Goldsmith in *Digital Transformation: Wiring the Responsive City,* predictive analytics can deter crime and improve disaster planning.[10]

Cities are using various mobile apps for crowdsourcing—obtaining expertise and ideas from constituents—to improve city service delivery. Boston was an early developer and implementer of crowdsourcing apps with *Citizens Connect*. Additionally, several case study cities, including Seattle, New York City, Louisville, San Francisco, and Boston have developed entire app portfolios containing multiple apps to improve access to city services.

Action Six: Foster a Culture of Creativity and Collaboration

Management should encourage risk taking and collaboration across the silos of city departments. Furthermore, city leadership should encourage and support partnerships with the community and industry. To improve service provision, many cities have the following:

- Flexible organizational structures

- Strategic planning

- Funding

- Evaluation

- Public engagement

- Support for new technology and innovation

Cities should have internal cultures that stress collaboration rather than silos and promote creativity, innovation, and transparency.

Examples of Fostering a Culture of Creativity
Implementing new governance and technology in cities requires a culture of creativity and collaboration with external outreach, events, and champions. Culture is key to the iterative

10.   Stephen Goldsmith, *Digital Transformation: Wiring the Responsive City;* Civic Report No. 87. (Manhattan Institute, Center for State and Local Government: New York City, June 2014) Retrieved from www.datasmart.ash.harvard.edu/assets/content/cr_87.pdf

development of collaborative and concrete measures to sustain new processes and technology for city service delivery. Attitudes and environments that embrace iterative development and promote participation and experimentation are necessary cultural components.

Cities are collaborating with foundations, universities, nonprofits, and industry. In San Francisco, the mayor's Civic Innovation Office has a Fellows program that seeks Fellows who have experience working across sectors, a belief in technology, and a passion for innovation. San Francisco also has an Entrepreneur in Residence program.

In August 2014, Philadelphia Mayor Michael Nutter opened an Innovation Lab for city employees. The lab is a place for city staff to collaborate with people from the technology community and area colleges and universities. Riverside has created a city technology and public engagement advisory board.

In Kansas City, the mayor has created the Mayor's Challenge Cabinet. Young women and men from across Kansas City can apply to be part of project teams and task forces organized around initiatives to improve city policy and governance.

Several cities, including Boston, Chicago, Louisville, and San Francisco, have been quite active in soliciting constituent development of online government applications and tools. Additionally, some cities have been launching programs for entrepreneurs such as Digital.NYC, a one stop-shop with everything technology related for job hunters and entrepreneurs in New York City. Philadelphia has launched FastFWD, a civic tech accelerator program.

Part II

Selected Best Practices: Case Study Cities

Austin, Texas

Austin has a population of 885,400 and serves as the center of the Austin-Round Rock-San Marcos metropolitan statistical area. It is the state capital and Austin's major industries include technology, tourism, education, and government. Austin now has Google Fiber.

Recognition

Recognition and awards received by Austin include:

- Center for Digital Government Best of the Web winner

- GovFresh Award winner

- Austin's chief information officer won the Association of Information Technology's Public Sector Information Technology Executive of the Year award

Best Practices

- Open Austin, now an official Code for America Brigade, worked with the city on its website development, and the city formed an advisory group of community members, AustinGo Advisory Group, to also collaborate on the website. The city worked with local technology companies, and at the end of 2011, it launched the website using an open source plat- form, and an open data portal that the AustinGo Advisory Group and Open Austin advo- cated. Open Austin worked with the city on an Austin City Council open data resolution that the city council adopted in December 2011. Open Austin continued to work with the city on Code for America initiatives, on the creation of an innovation office, and on creating mobile apps.

- The Office of Sustainability worked with a start-up company to develop a mobile app in conjunction with Earth Day 2014. The app, *Rethink*, encourages residents to adopt green habits to enhance the city's sustainability efforts with resources, games and money-saving tips.

- In August 2014, Austin released a mobile 3-1-1 app, and the city's ATX floods app provides real-time information on road closures during flooding events.

- Austin has two tools that improve coordination of capital improvement projects and city activities:

  — *CIVIC:* The tool allows residents to visualize capital improvement projects with inter-active maps, find information about projects, and get updates on the capital improvements program.

  — *IMMPACT:* The tool coordinates permit and project information for road, water pipeline and other projects, using geographic interface on maps to show conflicts and collaboration opportunities.

- Austin's Neighborhood Partnering Program, with the city's Public Works Department, awards funding to neighborhood groups that share the cost with the city to build small to medium-sized community capital improvement projects in the city's right-of-way or on city-owned property.

- In October 2014, the Austin Technology Council and the city of Austin created a new partnership, the Austin Technology Partnership. The partnership's goal is to strengthen tech as an economic engine for the community, and to provide data collection and analysis to understand the talent and capital resources to support an innovation economy.

Boston, Massachusetts

Boston has a population of 645,966 and is a part of the larger metropolitan area of Greater Boston. Its major industries include education, biotechnology, tourism, and financial services.

Recognition
Recognition and awards received by Boston include:
- Technology Achievement awards from the Public Technology Institute

- Digitalcommunities.com named Boston #1 Digital City in America

- Center for Digital Government Best of the Web winner

- GovFresh Award winner

Best Practices
- In 2011, the mayor of Boston created the Problem Properties Task Force for city agencies to collaborate, predict, intervene, and prevent community disorder. The city uses data sets from various departments, such as police, fire, inspections, and neighborhood services, to

use tools, analytics, and reports for making decisions regarding policing, code enforcement, foreclosures, and other city activities to address problem properties.

- Nigel Jacobs and Chris Osgood co-chair the Mayor's Office of New Urban Mechanics. They work closely with other Boston units such as the Department of Public Works and the Department of Innovation and Technology. They have partnered with universities, including Worcester Polytechnic Institute, MIT, and Harvard, and the Boston Area Research Initiative (BART), an interuniversity research initiative that connects Boston area scholars and practitioners for cutting edge urban research.

- Boston was an early entrant in developing mobile apps to improve service delivery by developing *Citizens Connect* in 2009 in partnership with a local technology company, Connected Bits. With the *Citizens Connect* app, residents can report problems, request services, and send photos directly from their Smartphones. Boston has made *Citizens Connect* available to cities across Massachusetts.

- By using a new app, *Street Bump*, residents can report potholes via vibrations from an app on their mobile phones in their cars.

- City employees use the mobile app, *City Worker*, internally. *City Worker* provides a platform for city staff to create new cases and to manage constituent requests in real time while employees are in the field.

- In August 2014, Boston held a hackathon, HubHacks, to challenge community IT developers to devise a new online permitting system by using the city's information and programming interface. In December 2014, Mayor Walsh unveiled *Permit Finder,* an online and mobile app. *Permit Finder* is an online tool that contractors and the public can use to track inspection service department and fire department permits through the approval process, and it also displays open reviews during the review process.

Chicago, Illinois

Chicago has a population of 2.7 million and serves as the center of the Chicago's metropolitan area. Its major industries include financial services, engineering, publishing, and food processing.

Recognition
Recognition and awards received by Chicago include:
- fDi Intelligence has recognized Chicago as a U.S. City of the Future

- Recognized by *InformationWeek Government* as one of the Top 10 Government IT Innovators

- Center for Digital Government Best of the Web winner

- GovFresh Award winner

Best Practices

- Chicago is a leader in open data and the development of an open data repository. In 2011, it was the first U.S. city to appoint a Chief Data Officer position. Chicago also has produced "A Report on the Status of Open Data in Chicago and Actions for 2014." The city's open data portal has more than 850 data sets.

- Bloomberg Philanthropies awarded Chicago a $1 million grant to develop an open-source, predictive analytics platform, the SmartData Platform. The SmartData Platform's first tool, *WindyGrid*, uses spatial analytics to present a single point, real-time view of operations across the city including 3-1-1 and 911 data, asset locations, building information and tweets, to provide city employees with comprehensive analysis of a specific location. *WindyGrid* also has predictive analytic capabilities to support service delivery decisions.

- Chicago has numerous mobile apps, including the Department of Health's mobile app, Heart Health Mobile, which helps people assess their risk for heart disease, such as heart attacks and strokes.

- Chicago has developed an app with interactive maps displaying all of the city's residential parking zones and their restrictions.

- Chicago has an online tool and a mobile app to engage the public in the redevelopment of the Kedzie Corridor to bring jobs, affordable housing, and economic development to the area. Residents can go online to an interactive map where they can post ideas and photos regarding Kedzie Corridor planning, take an online survey regarding the redevelopment project, and link to a mobile app to share ideas and photos.

- Chicago is using predictive analytics for services as varied as controlling rat populations and improving public health. The Chicago Departments of Health and Technology and Innovation are piloting predictive analytic models for food protection, tobacco control policy, and lead inspection programs.

Kansas City, Missouri

Kansas City has a population of 464,310 and serves as the center of the metropolitan area of Kansas City. Its major industries include agribusiness and federal government. Kansas City was the first city to have Google Fiber.

Recognition

Recognition and awards received by Kansas City include:

- *PC Magazine* listed Kansas City as one of the "10 High-Tech Cities You'll Want to Call Home"

- Center for Digital Government's Digital Cities award winner

- Public Technology Institute award winner

Best Practices

- As part of the Mayor's Challenge Cabinet, young women and men from across Kansas City can apply for project teams and task forces organized around initiatives to improve the city's policies and governance. Mayor Sly James appointed his second Challenge Cabinet on September 15, 2014. The mayor has organized his second Challenge Cabinet around the following specific initiatives to improve city policy and governance:

  — Innovation Policy Task Force

  — Open Data Project Team

  — Technology Roadmap Task Force

  — Community Engagement Project Team

  — Ideas Fair Project Team

  — Open Project Teams

- *KC Momentum* is an online tool using MindMixer technology to solicit community input on improving service delivery via online conversations.

- Kansas City is using apps to enhance services, such as the *KC Streetcar* app that will highlight and promote restaurants, shops, and attractions along the streetcar route during streetcar construction.

- Kansas City launched a website that made it one of largest city users of the open source WordPress platform. Using WordPress reduced the new website cost by 75 percent compared to the previous website development. The new website has an open data portal with more than 3,500 data sets. Additionally, the website has resources for opening a business, and residents can use the *KCStat Dashboard* to monitor the city's performance on 24 strategic priorities.

Louisville, Kentucky

Louisville has a population of 609,891 and is part of the larger metropolitan area of Jefferson County. Its major industries include health care and tourism.

Recognition

Recognition and awards received by Louisville include:

- Recognized as one of the "Best Entrepreneurial Cities" by Entrepreneur.com

- PolicyMic.com recognized Louisville as one of the top Creative Cities for 20-Somethings

- Center for Digital Government's Best of the Web winner

- Digital Cities award winner

Best Practices

• In 2011, Louisville received a $4.8 million Bloomberg Philanthropies grant to develop innovative ideas to improve city services by supporting a full-time Innovation Delivery Team. The team redirected 26 percent of low-severity 911 medical calls to a doctor's office, instead of using an ambulance to an emergency room. Also, the team reduced zoning approval times by seven weeks, and increased animals leaving pet shelters alive for adoption from 30 percent to 2012 to 77 percent in 2014. The city continues to use innovative research and development to improve services.

• In 2014, Living Cities selected Louisville as one of the first cities in its City Accelerator. Louisville will use its existing innovation toolkit and new City Accelerator processes to enhance fire response time and better serve people with mental illness and substance abuse issues.

• The city is partnering with the community to improve the city's air quality and environment. Louisville's public health agency, air pollution control district, and other entities are collaborating on a program with the community to deploy 100 low-cost air quality monitors that residents have agreed to fund at $200 each. The city also is partnering with the Community Foundation of Louisville to find donors to raise additional money for other, similar projects.

• To improve Louisville's environmental practices, the city is part of the partnership for a Green City collaboration. The partnership leverages collaborative planning, education, collective purchasing, and professional expertise to promote sustainability with land and water management, waste disposal, transportation, and energy use. More than 150 people participate on partnership teams.

New York City, New York

New York City has a population of 8 million and serves as the center of the New York metropolitan area. Its major industries include financial services, media, communications, and technology.

Recognition

Recognition and awards received by New York City include:

• *InformationWeek Government* IT Innovators Award

• Winner City of the Year and Best Use of Social Media in the GovFresh Awards

• Center for Digital Government Best of the Web winner

- Digital Cities award winner

- Public Technology Institute award winner

Best Practices

- New York City has an annual BigApps Challenge, which began in 2009, in which participants create online and mobile apps with crowdsourced data. The challenge has launched hundreds of apps, and now, participants have access to the New York City Open Data Portal with more than 1,300 data sets, and a Resident Toolkit. New York City has a Developer Portal with an API Showcase and an App Showcase. The New York City Department of Transportation has a new Data Feeds website with open data to support traffic initiatives. The Data Feeds site includes interactive Vision Zero Crash and an Interventions Map that displays crash types, dates, locations, bike and car parking information, traffic advisories, street construction, and real-time data.

- New York City created the first city Chief Digital Officer position in 2011, and the city has been a leader in creating an internal organization for using technology to improve service provision. Former mayor Michael Bloomberg made implementing digital and mobile applications for service delivery a high priority in his administration with his goal of New York City becoming a leading digital city. Under Bloomberg, all city agencies measured their performance against annual goals and reported that directly to constituents.

- In October 2014, Mayor Bill de Blasio announced the launch of Digital.NYC as the official online, one-stop shop to learn about everything related to technology in New York City with resources for job hunters, business startups, investors, and nonprofits. Digital.NYC is a partnership between the New York City Economic Development Corporation, IBM, Gust, and more than 12 technology and media companies.

- New York is a leader in using data and predictive analytics to improve service delivery. In 2009, the New York City Office of Policy and Strategic Planning hired Mike Flowers as director of analytics and head of the Policy and Strategic Planning Analytics team. In 2013, Mayor Bloomberg created the Mayor's Office of Data Analytics and selected Flowers as the city's first chief analytics officer to help agencies share data with each other and the public with tools to improve service delivery.

- New York City uses data mining and predictive analytics to uncover mortgage fraud, expired business licenses, prescription drug abuse, and fire hazards. Using big data from myriad sources, including illegal building conversions, foreclosures, rodent complaints, and crime rates, the city's analytics team increased the New York City's Department of Buildings' findings of risky building conditions from 13 percent to 70 percent, which the fire department correlated with fire risk.

- In May 2013, New York City announced its new Risk-Based Inspection System application, which uses data from multiple sources to prioritize and better assess fire risk in the 50,000 buildings that the fire department inspects annually.

Philadelphia, Pennsylvania

Philadelphia has a population of 1.6 million and serves as the center of the metropolitan area of Delaware Valley. Its major industries include bio-science, financial services, and tourism.

Recognition

Recognition and awards received by Philadelphia include:

- Public Technology Institute recognized Philadelphia with a Best of the Web award for its business services portal and website

- Public Technology Institute recognized Philadelphia with a Technical Solutions Award for its outstanding application of information technology with the Philly311 app

- GovFresh Award winner

- Digital Cities award winner

Best Practices

- Story Bellows and Jeff Friedman are co-directors of the Philadelphia Mayor's Office of New Urban Mechanics. Philadelphia departments, such as the Office of Innovation and Technology, work closely with them. With the Office of New Urban Mechanics, Philadelphia was an early adopter of mobile apps. It was the first city to use *Textizen*, which it developed with Code for America and entrepreneurs, to enable residents to text feedback regarding the city's ongoing comprehensive plan, Philadelphia 2035.

- Through its participation in the Bloomberg Philanthropies' Mayors Challenge, Philadelphia is improving city procurement processes.

- In March 2014, Philadelphia launched, FastFWD, a civic tech accelerator with an initial class of 10 and $10,000, to use city data to devise public safety solutions. FastFWD is a $1 million partnership among the Mayor's Office of New Urban Mechanics, GoodCompany Ventures, and the University of Pennsylvania's Wharton Social Impact Initiative. The initial class finished the 12-week program in 2014.

- In January 2014, Philadelphia opened its Municipal Innovation Academy in partnership with Philadelphia University. There are 19 front-line employees from various city departments whom their supervisors and peers selected to participate in the academy and learn innovation processes. The academy is an eight-week program with $100,000 in funding from the Mayors Fund for Philadelphia for real problem-solving projects.

- In August 2014, Philadelphia Mayor Nutter opened an Innovation Lab for city employees. The lab is a place for employees to collaborate with people from the technology community and area colleges and universities. The lab provides a space for creative thinking, and it works with the Municipal Innovation Academy. Philadelphia's Chief Innovation Officer

plans to rotate topics every 90 days, and the goal is to improve service delivery, civic engagement and transparency.

Riverside, California

Riverside has a population of 303,871 and is part of the larger metropolitan area of the Inland Empire. Its major industries include technology and education.

Recognition
Recognition and awards received by Riverside include:

- Intelligent Community Forum recognized Riverside as an Intelligent Community of the Year

- Center for Digital Government Best of the Web winner

- Digital Cities award winner

Best Practices
- Riverside has a new website with the Engage Riverside transparency portal that includes city records and open data. Mobile-first is a philosophy that recognizes the prevalence of mobile devices and makes mobile applications a priority. Riverside has been using mobile-first practices, such as *SmartRiverside*, an initiative to attract technology companies. The website was built with responsive design, and it is very friendly to mobile users. Also, Riverside has a new project management office to implement best practices citywide for technology projects.

- Riverside has created a technology and public engagement advisory board that includes: the mayor, six major technology company chief information officers, the city manager, two deans of engineering schools from local universities, two school district representatives, and community member representatives. The advisory board plans and advises development and it also contributes concrete resources and people for projects. Together, the participants plan and develop technologies, and then, the institutions involved adopt these technologies, creating a similar participatory experience across multiple sectors of the city.

- Riverside engages in a formal employee exchange with partner organizations such as Xerox. City employees are embedded in Xerox, and Xerox employees are embedded in the city government. Through these partnerships, companies gain insight into the challenges faced by cities, and cities are able to better use the technologies that companies develop.

Salt Lake City, Utah

Salt Lake City has a population of 191,180 and serves as the center of the Salt Lake metro-politan area. Its major industries include tourism, health care, and transportation. Salt Lake City currently is on Google's upcoming list for potentially installing Google Fiber.

Recognition

Recognition and awards received by Salt Lake City include:

*   Center for Digital Government Best of the Web winner

*   Digital Cities award winner

Best Practices

*   Salt Lake City has made significant strides in public engagement with its Open City Hall platform, which is an online tool that residents can use to post opinions regarding city issues. The city then provides feedback to residents and uses their input to help guide the city's decision making.

*   The city has developed an online Sustainable City Dashboard to track its progress on its five-year, Sustainable Salt Lake – 2015 Plan. The plan covers 12 topics: Air & Climate, Energy, Transportation, Recycling, Open Space, Urban Forestry, Water, Arts & Culture, Health & Safety, Housing, Food & Nutrition, and Education. The dashboard, available in 80 languages, allows residents to explore concrete actions that the city has taken in each area with more than 100 total metrics. The dashboard also provides public engagement opportunities for residents to share their ideas and concerns, using the Open City Hall platform.

*   Salt Lake City developed the *SLC Mobile* app allowing residents to report 3-1-1 issues in real time and use GIS maps that the city updates in real time. The *SLC Mobile Launcher* app provides residents a variety of services including utility bill payment, alternative fuel locations, and bus routes.

*   Salt Lake City has been innovative in allowing employees to bring and use their own technology devices to work.

San Francisco, California

San Francisco has a population of 837,422 and serves as the center of the San Francisco Bay Area. Its major industries include banking and finance, technology, tourism, and education.

Recognition

Recognition and awards received by San Francisco include:

- Winner of the Sunshine Review's Sunny Award in recognition of its performance on transparency

- A CIO 100 Award for SFGov Mobile

- Center for Digital Government award winner

- Public Technology Institute award winner

Best Practices

- The mayor's Civic Innovation Office has a Fellows program that seeks individuals who have experience working across sectors, a belief in technology, and a passion for innovation. The city hires three mayor's innovation fellows to work as entrepreneurs, innovators, and leaders for innovation within the city and the greater community. Additionally, the Fellows participate in an extensive professional development program, and then they share their knowledge with other city staff.

- The city has a robust open data portal, *DataSF*, including a developer page, *DataSF Developer Resources,* with tips on API use and submitting apps. The site has a *DataSF* showcase that displays numerous apps that developers have created using the city's data.

- San Francisco is piloting a new disaster dashboard, the *Appallicious* emergency dashboard. The dashboard collects real time emergency response data from various departments and agencies and it links to local resources such as people with CPR training.

- The city created a partnership with the business community through the new city of San Francisco Entrepreneur-In-Residence program. The purpose of the program is to combine government and startups to explore ways technology can help make government more responsive, participatory, accountable, and efficient. To determine partners in the effort, the city sent out a call for participation. Twenty-five organizations worldwide submitted applications, representing innovation potential in education, health care, transportation, public utilities, public safety, infrastructure, and the environment. A board with internal and private sector representatives, as well as the city's CIO, selected six startups from 200 applications. The program will run in test mode for a pilot term and will focus on civic engagement, location-based services, and urban planning.

Seattle, Washington

Seattle has a population of 608,660 and serves as the center of the Seattle metropolitan area. Its major industries include clean energy, aerospace, and defense.

Recognition

Recognition and awards received by Seattle include:

• Center for Digital Government Best of Web winner

• Digital Cities award winner

Best Practices

• In December 2014, Bloomberg Philanthropies awarded Seattle an Innovation Team grant of $750,000 a year for three years. Seattle's Office of Policy and Innovation will help the mayor and city staff use data and performance management to address various Seattle challenges, including integrated neighborhood and transportation planning, housing affordability, and homelessness.

• Seattle's mayor has an IT subcommittee composed of the deputy mayor, city CTO, and six city department heads who are centralizing the city's IT services. Seattle has a Citizens Telecommunications and Technology Advisory Committee that works on issues such as online services and technology access and makes recommendations to the mayor and city council. The city has a technology matching fund that makes grants up to $20,000 for technology projects in the community.

• Seattle is using data and technology in crime prevention. The city provides online mapping of crime incidents and the Seattle Police Department is taking an innovative approach with an event that it held on December 19, 2014 with more than 80 people in attendance. The purpose of the event was to find a better method for archiving the 1.6 million videos consisting of 314,000 hours of footage from the dashboard cameras mounted on the city's police cars. The Seattle Police Department's goal is to automatically release all police video footage online. Various software developers presented ideas at the event and the Police Department currently is seeking a contract with a cloud vendor to put the videos online.

Washington, D.C.

Washington, D.C. has a population of 646,449. Its major industries include federal government, education, and tourism.

Recognition
Recognition and awards received by Washington, D.C., include:

- Center for Digital Government Best of the Web winner

- Digital Cities award winner

- Winner of awards from Public Technology Institute and the National Association of State Chief Information Officers (NASCIO)

Best Practices

- The city has an online Open Data Catalog with 500 datasets. People can go to the online catalog and see popular downloads, live data feeds, custom downloads, and Google Maps, and create their own visualizations. The catalog has a feature that allows users to browse data by category or enter a keyword to search. Washington agencies have a variety of mobile apps that residents can use to find public computer access, schools, parking, hospitals, fire and EMS, and other services. The city also has a Connect DC-Digital Inclusion Initiative with a variety of partners, resources, and events that people can link to from the DC.gov website. The goal is to close the digital divide by providing computer and internet access, creating tools for new technology users and collecting data on digital inclusion.

- *Grade.DC.Gov* is a performance management and tracking tool that Washington created with a private company. It is an online platform through which residents can submit comments about some of the city's agencies and they also can obtain information about how other residents graded the agencies.

- *Green Dashboard* in an online tool that residents can use to get information on the city's environmental sustainability performance, download data and charts, and learn about sustainability measures.

- The District of Columbia Water and Sewer Authority is using real-time data about water hydrant flow capacity to inform firefighters of hydrant status when they are going to a fire scene.

Appendix I: Methodology

To understand the efforts and internal and external environments of cities as they begin using new policies, governance structures, and digital and mobile technologies for better service delivery, researchers employed three primary methods. They are:

- A literature review of relevant materials from the field

- A review of documents produced by case study cities related to their efforts

- Interviews with various case study city officials and partners in technology development

Researchers chose relevant cities based on their appearance in the current literature and their appearance in the range of innovative cities. Additionally, the cities represent a variety of municipalities across the nation. The case study cities are at various progress levels, but all have begun development and implementation of new methods to improve service delivery.

The city document review covered strategic plans, ordinances, resolutions, organizational documents, formal partnership agreements, and website content. Researchers analyzed information such as content organizational structures, performance metrics, best practices, funding methods, partnerships, and event notes.

The literature review involved an examination of statistics regarding innovative policies and the use of digital and mobile methods, a survey of efforts cities are making to develop and implement new governance structures and digital and mobile technologies to improve service delivery, and a scan of cities' operating environments. In addition to books, reports, and journals, the literature reviewed included publications from other sources, including foundations, nonprofits, and universities.

Interview Questions

- How are you organizing internally for digital and mobile services delivery?

- Who do you partner with: public, private, nonprofits, foundations, universities?

- What new models are you using to improve service delivery?

- How are you coordinating resources?

- Who are your silo busters?

- Which office is responsible for development and engagement?

- Do you have an innovation officer?

- Do you have a data officer?

- Do you have technology and engagement champions?

- How do you determine project benefits and costs?

- Do you have an evaluation strategy?

- Do you have a specific funding strategy?

- What is your business case methodology?

- How are you using digital and mobile to support innovation in the city?

- How do you reach various demographic groups?

- How do you engage nontraditional participants?

- How do you involve constituents in development such as partnerships, hackathons, contests, and challenges?

- Which approaches do you use most for city engagement; for instance: regulatory changes, planning, capital improvements, and budgeting?

- Successes and failures

- Lessons learned and best practices

Appendix II: Glossary of Terms

API

API, an abbreviation of *application program interface*, is a set of routines, protocols, and tools for building software applications. The API specifies how software components should interact and are used when programming graphical user interface (GUI) components. A good API makes it easier to develop a program by providing all the building blocks. A programmer then puts the blocks together.[11]

Big Data

Big data is an evolving concept that refers to the growth of data and how it is used to optimize business processes, create customer value, and mitigate risks.[12]

Civic Innovation

"There is no set definition for "civic innovation." However, broadly speaking, it is about improving our cities through the implementation of tools, ideas, and engagement methods that strengthen the relationship between government and citizens. The civic innovation field encompasses diverse actors from across the public, private, and nonprofit spectrums."[13]

Civic Technology

"The emerging field of civic technology, or "Civic Tech," champions new digital platforms, open data, and collaboration tools for transforming government service delivery and engagement with citizens."[14]

Data Mining

"The process of discovering meaningful correlations, patterns, and trends by sifting through large amounts of data stored in repositories. Data mining employs pattern recognition technologies, as well as statistical and mathematical techniques."[15]

Digital Technology

"Digital technology is defined as of or relating to information that is stored in the form of the numbers 0 and 1 and characterized by computer technology."[16]

GIS

A Geographic Information System or GIS is a computer system that allows you to map, model, query, and analyze large quantities of data within a single database according to their location.[17]

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11. www.webopedia.com/TERM/A/API.html
12. http://businessofgovernment.org/sites/default/files/Realizing%20the%20Promise%20of%20Big%20Data.pdf
13. http://thegovlab.org/civic-innovation-cities-and-civic-tech/
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Innovation

The Bloomberg Foundation defines "innovation" as the creation of new solutions for city challenges or the adaptation of solutions that have been tested elsewhere.[18]

Internet of Things

"The 'Internet of Things' (IOT) is a term used to describe the ability of devices to communicate with each other using embedded sensors that are linked through wired and wireless networks. These connected devices use the internet to transmit, compile, and analyze data."[19]

Mobile Platforms = Smartphones and Tablets

App = a shortened form of the word application, which is a software program used for a computer, tablet, or Smartphone.[20]

Mobile Technology

"Mobile technology is exactly what the name indicates: technology that is portable; it refers to any device that you can carry with you to perform a wide variety of "tasks." It is technology that allows those tasks to be performed via cellular phone, personal digital assistant (PDA), vehicles, laptops, etc. A standard mobile device has gone from being no more than a simple two-way pager to being a cellular phone, a GPS navigation system, a web browser, an instant messenger system, a video gaming system, and much more."[21]

Open Data

"Open data is data that can be freely used, shared and built on by anyone, anywhere, for any purpose."[22]

Public Engagement

"Public engagement is a new way of thinking about how governments, stakeholders, communities, and ordinary citizens can work together to achieve complex, societal goals."[23]

Predictive Analytics

"Predictive analytics is the practice of extracting information from existing data sets in order to determine patterns and predict future outcomes and trends."[24]

Transparency

"True government transparency goes beyond simply providing information or data. First, the data must be accessible and useable. Second, providing data is not enough; the data must have context."[25]

18. www.bloomberg.org/content/uploads/sites/2/2014/04/IDT-Playbook-full.pdf
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Acknowledgements

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Sherri R. Greenberg, MSc is a Clinical Professor in Public Policy Practice and Fellow of the Max Sherman Chair in State and Local Government at the Lyndon B. Johnson School of Public Affairs at the University of Texas at Austin. Her current teaching and research interests include: government technology and innovation, transparency and civic engagement, public finance, campaigns and elections, urban and state affairs, and community and regional planning. Her recent publications are: *Congressional Committees and Social Media, Congress + Social Media, Transparency Issues in E-Governance & Civic Engagement, Beyond Raw Data, Texas Financial Transparency: Open and Online, Federal Lines of Business E-Government Initiatives: Progress and Effects, and State E-Government Strategies: Identifying Best Practices and Applications.* Professor Greenberg received an MSc in Public Administration and Public Policy from the London School of Economics and a BA in Government from The University of Texas at Austin.

Greenberg served for 10 years as a member of the Texas House of Representatives, completing her final term in January 2001. In 1999, the Speaker of the House appointed her to chair the House Pensions and Investments Committee and to chair the Select Committee on Teacher Health Insurance. She served two terms on the House Appropriations Committee, and served on the Appropriations Committee's Education, and Major Information Systems Subcommittees. Previously, Greenberg was the City of Austin Capital Finance Manager, and she was a Public Finance Officer at Standard & Poor's Corporation in New York. She is a member of the City of Austin General Obligation Housing Bond Review Committee, and she is a member of the State of Texas website, Texas.gov, Executive Steering Committee. In February 2015, the Travis County Commissioners Court appointed Greenberg to the Board of Managers of Central Health.

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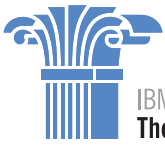
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