Digital Services

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All over the world, high-performing governments are reinventing the way they provide services. They are going digital to save money while simultaneously increasing citizen satisfaction. More than any other city responsibility, digital city services embody *happier for less.*

The delivery of services represents the bulk of government spending (approximately 70% according to a 2009 study). Switching to digital delivery is already saving hundreds of millions of dollars for cities around the world. For instance, the City of Dubai estimates that its Smart Dubai phone app – which delivers services from more than five dozen agencies – will save more than $1 billion over a decade, while greatly improving citizen satisfaction.

But the benefits are not limited to saving money and pleasing citizens. As we'll explore, digital city services provide five key benefits:

1. Increased citizen engagement
2. Increased employee productivity
3. Increased competitiveness
4. Increased citizen satisfaction
5. Reduced costs

Digital city services provide multiple benefits to citizens and to local government. They embody "happier for less" – using digital technologies to spend less while simultaneously improving service to citizens.

Digital services deliver city functions via web, smartphone and kiosks. Yet even today, many governments still think of the Internet and smartphones just as communications tools, not as better ways to provide services.

And even today, many governments still think of citizens as inhabitants, not as customers. We urge governments to think in terms of customers instead. For one thing, "citizens" is too limiting – cities also serve tourists, day workers, businesses, investors, city staff and many others. For another, a customer-centric approach will improve government results, just as it improves results in the private sector.

It's not a new idea that governments should be customer-centric. In practice, however, it can be difficult. First, city governments generally do not think of issuing permits, giving tickets or enforcing regulations as customer service, so staffers must first go through an "attitude adjustment." Second, some legacy systems cannot handle digital services, so the transition to digital delivery may involve building or buying new technology.

To help you make this essential transition, we'll first discuss the forces for and against, so you understand what's powering this movement and what stands in the

way. Next we'll explain the benefits you can expect and list more than a dozen different kinds of services to consider. We'll finish up with best practices developed over the past 10 years. Along the way, we'll reference success stories and lessons learned.

Forces for and against digital city services

Read this section to understand why digital services are becoming the norm and to understand the barriers you are likely to encounter.

Why has digitalization become such a powerful trend? In addition to the benefits described above, three forces are at work: 1) growing populations; 2) growing expectations; and 3) shrinking budgets.

Growing populations. By some estimates, five million people move to (or are born in) cities every month. By 2050, 70% of the world's population will be living in urban areas. And in many places – the United States and parts of Europe, for instance – the percentage is already over 80%. As cities grow at tremendous rates, they cannot keep up using paper and manual processes. Only digital technology has the hope of keeping up.

Growing expectations. Governments are coming under pressure to offer the same excellent experience as the private sector. A 2016 survey of citizens from a dozen global cities, for instance, found that 85% expected government services to be as good as those from private companies. Another survey conducted by the McKinsey Center for Government revealed that citizens are frustrated by confusing city websites and find it's often still necessary to speak with multiple parties. As one mayor jokes: Modern corporations say "there's an app for that." Old-fashioned corporations say "there's a form for that." Governments say "there are 17 forms for that."

 Shrinking budgets. City resources are not keeping up with growing populations and growing expectations. Yet in many parts of the world, allocations from national governments are contracting. Cities are finding it hard fund infrastructure. This has created a divide between what citizens expect and what cities can provide. One 2016 survey found that citizen satisfaction with local governments in the developed world was at a 10-year low. As a result, governments are turning to digital technology to do more with less.

The barriers to digital city services

Despite the benefits described above, there are obstacles along the path. Don't be alarmed – all of these issues have solutions, especially when you are armed with best practices from those who've gone before. But it's wise to know the hurdles you are likely to encounter.

Aging infrastructure. Even cities with the best of intentions grapple with aging infrastructures and outdated legacy systems. Many cities discover that they must first upgrade their broadband networks or replace old software before they can even start on digital services.

Separate, siloed departments. For hundreds of years, cities have operated as a collection of separate departments, each with its own budget and own priorities. It's difficult to share and collaborate in such an environment. The departments don't have access to each other's data. Critical information is trapped in standalone, single-purpose systems, and not accessible in real-time. And the go-it-alone mindset causes multiple departments to reinvent the same wheel, while missing opportunities to share infrastructure and share costs.

Singapore provides a great example of a city that embraces cross-cutting collaboration. Launched in March 2003, the SingPass system gives customers a common online password to interact with all government agencies. Nearly five dozen government agencies provide nearly 300 digital services, including business registration, tax filing, and passport applications.

Citizens increasingly expect city services to be delivered via smartphone or web browser. Cities that fail to make this transition will be at a competitive disadvantage. And they will be spending more than necessary to provide services, since digital interactions are far cheaper than those by phone or in person. As a result, more and more cities are choosing to be "digital by default."

Singapore is a world leader in e-government. Residents can gain access to nearly 300 e-services with a single sign on.

Data overload. City employees struggle to find information, spending hours updating spreadsheets or waiting for answers, even though data is being produced in much larger quantities from a wider variety of sources. Yet much of that data is left unanalyzed, robbing the city of the alerts and insights that can dramatically improve results.

Governance and change management. Many cities have not yet made the transition to a digital mindset. They are not set up to manage cross-cutting initiatives that require departments to collaborate. They may also have antiquated procurement regulations that make it difficult for departments to buy shared equipment, shared services or cloud-based solutions.

If you are building a system that will affect 10 departments, who's in charge? Who pays? Who has the right to access the data? Who has the obligation to update the data? Who's in charge of security?

And what if you are building a system that will affect 10 other cities? Governance issues are magnified and complicated by geographical boundaries. A large metropolitan region may have hundreds of different cities, towns, districts and agencies with overlapping jurisdictions and conflicting agendas.

Lack of interoperability. When the state of Illinois set out to modernize in 2015, it discovered that it had 85 separate ICT departments, each with its own agenda, priorities and budget. Many cities are in a similar situation. They operate with a disparate collection of standalone systems, making it difficult and expensive to share data and share costs. Even when cities switch to smart technologies, they discover that the industry does not yet have all the needed standards in place, forcing cities to be slow and cautious lest they end up with isolated, disconnected systems.

Lack of capacity. Many cities lack employees skilled in cloud software, Internet of Things, citywide networks, data science, interface design, mobile computing and the other new technologies that come together in a smart city. They must rely on academic, philanthropic or private-sector help to get started while launching training programs to build digital skills. Without adequate technical and managerial talent, cities cannot keep pace with the increased demand for urban services. Indeed, they may not even be able to adequately manage and monitor the companies that work for them.

Privacy and security. Some cities hesitate because of data privacy and cybersecurity fears. As the Readiness Guide states in the chapter on Foundational Principles, citywide policies for privacy and security are essential before beginning your smart city journey.

Benefits of digital city services

Smart technologies bring substantial benefits to society, to government and to the economy.

Increased citizen engagement. The digital wave is transforming the relationship between governments and their customers. Governments can now engage much more deeply with citizens, actively involving them in planning and policymaking.

Digital technologies allow citizens to participate more conveniently and more fully in the planning and operation of their city. That participation may include online participation in surveys, budgeting, council meetings, and town hall meetings. It may also include ways for citizens to help the city, by reporting problems or by helping the police in their investigations. For example, Boston's BOS:311 app lets citizens report things that need fixing, such as potholes or public lighting. Once fixed, the city worker snaps a photo of the repair and sends it to whoever reported the fault. Some even include a photo of the work crew.

Digital technologies also allow governments to listen to their constituents more conveniently, quickly and accurately. Citizens express their thoughts, beliefs, and needs in millions of digital conversations each day. The vast majority of those conversations are NOT direct communications with the city, but conversations with each other.

Cities can now apply advanced analytics to publicly posted information such as traditional print, social media, blogs, forums, message boards, wikis, online videos, even TV and radio. These analytics provide deeper insights into how city programs are received by constituents. And they allow cities to more easily spot issues and trends, so they can take more informed steps to address problems and opportunities.

Increased employee productivity. The same technologies that help citizens can also make City Hall leaner, faster and more effective. First, they make employees more efficient by giving them digital tools to do their jobs, even when they're in the field. Second, they make employees smarter. Analytics can help governments identify pain points, plan more successfully and enforce more effectively (tax fraud, for instance).

Third, smart technologies make it easier for departments to collaborate. For instance, even if buses, metros, trams and trains don't connect physically, a smart app can merge them into an integrated service. Likewise, infrastructure such as power, water, storm water, sewage, waste management and roads can be monitored digitally, creating new insights and solutions not possible when each component lives in its own silo. This cross-cutting collaboration also enhances service delivery for customers, who get a one-stop shop to meet their needs.
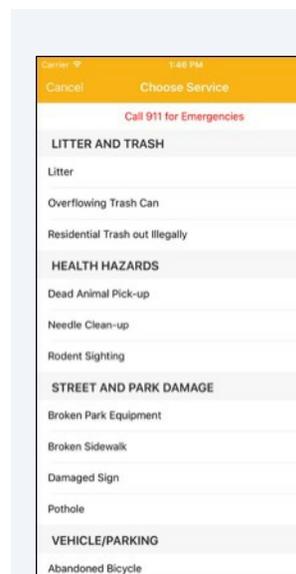
Going digital is far more than improving the "front end" of service delivery. It is essential to re-think and (in some cases) re-make the back end business processes.

Increased competitiveness. Businesses increasingly seek to locate in cities that have the robust digital infrastructure necessary to succeed in the global economy. And talented workers increasingly seek cities that provide the connected lifestyle they prefer.
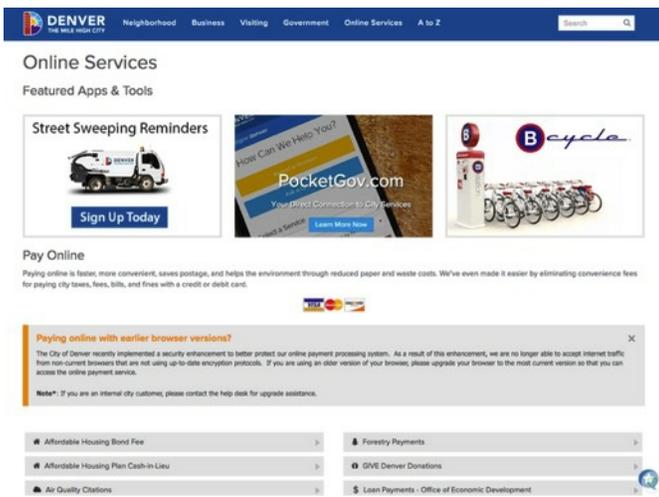
Increased customer satisfaction. Most of us know from our own lives the benefits of doing business online (versus in-person or by phone). Consider the task of opening a restaurant. Analog cities often require you to deal with a dozen or more different departments and agencies, sometimes in person. Digital cities have a single online form, with the information automatically passed through to any and every department that needs to know. Digital cities with pedestrian and traffic flow data can even help pinpoint prime business locations and determine the best hours of operations.

Boston residents can report problems on their smartphones thanks to the Boston:311 app. They can also call 311; or tweet @BOS311; or use the city's web site.

And it's not just the added convenience that increases satisfaction. Digital technologies also provide easier, more effective ways for citizens to monitor city government. That increased transparency and accountability boosts credibility and trust.

For instance, the combined site for the City and County of Denver [1], Colorado, USA features a long list of services, tools and apps. Users can also access many functions via Denver's PocketGov.com [2] for mobile-friendly access.

Denver's award-winning portal provides access to a wide range of services for residents, businesses and visitors. It also offers a version called PocketGov, which is optimized for viewing on smartphones.

Reduced costs. Britain's 2012 Digital Efficiency Report found that a digital transaction can be 50 times less expensive than face-to-face and 20 times lower than phone. In 2015, the UK government estimated that moving transactional services to digital would save it nearly $3 billion a year.

The citizen services continuum. In general, services are less expensive (per interaction) as you progress to the right, although they may be more expensive to set up initially. Adding a new channel does not mean you can eliminate any of the old channels.

And there's another way smart technologies can help a city's budget. Digital solutions are increasingly available "as a service", thus transferring upfront capital costs to operational expenses. Even if a city can't afford to build a solution on its own, it may have the money to "lease" the solution month-by-month. For instance, the Norfolk County Council (UK) recently faced severe budget constraints. It used a cloud-based solution to transform municipal service delivery and achieve an overall annual saving of $10 million. As a bonus, the new solution transformed how internal departments collaborate.

The government of Belgium has turned to digital services to make life much easier for citizens and businesses while saving billions. The Crossroads Bank for Social Security [3] brings 3,000 social services (3,000!) into one network. Citizens need only enter information once, after which it is shared with any other agency that needs it. The Crossroads Bank for Enterprises serves a similar function for businesses. The initiative eliminated more than 260 forms and statutory declarations. Employers alone save more than one billion Euros annually.

Key categories of digital city services

This section reviews the different kinds of city services to give you a sense of the possible. In general, these applications automate service delivery and transactions. Many of them also push essential information to individuals so they can make better decisions and better use of city assets.

Before you rush off to implement one or more of these great ideas, be sure to skim the best practices section below. And be sure to review the chapter on Foundational Principles for a Successful Smart City.

Although some of these categories are primarily for the use of city employees, we include them here. First, providing electronic tools for employees is one important aspect of efficient e-government. Second, employee apps increasingly include ways for citizens to provide input (e.g. report graffiti) or to get updates (e.g. to notify them that the graffiti has been removed).

For a more exhaustive list of city services, European cities may want to consult the ESD Toolkit [4], which attempts to document the full range of services – digital or otherwise – offered by European cities.

Asset health and management. Provide workers the tools to monitor and repair assets such as pumps, transformers, roadways and buildings. Remotely monitor conditions to spot problems as soon as they occur. Use analytics to predict which assets are most likely to have issues next. Show locations on a map, including the locations of nearby repair crews. Even optimize the use of fleet vehicles, using software to determine how many vehicles are needed, where they need to be, and which route to take to minimize the traffic congestion.

Often interfaces with issue reporting, with mobile workforce management and with citizen relationship management.

Customer relationship management. A central repository to track and assist with citizen interactions. Some CRM software relates only to one aspect of the city-citizen relationship (as with the issue reporting and case management solutions described separately below). But full-scale CRM tracks and manages *all* aspects

of *all* relationships, whether with citizens, employees, partners or suppliers. Ideally, those people can speak to a city service rep who can see their full record and guide them to a resolution.

As of 2016, 90% of U.S cities and 70% of U.S. counties were using or planning to use CRM, according to the Digital Cities Survey [5].

Since CRM is intended as a central storehouse for interactions, it is integrated with many other applications, including city call centers, online portals, asset management software, contracts management, payments and mobile workforce management. In other cases, those applications are built into the CRM. Done right, CRM can transform how cities operate by enabling (and enforcing) collaboration between departments.

Advanced versions often include features such as a unified city portal; analytics to spot trends and emerging problems; and a knowledgebase that city employees can use to find answers.

Calendars. Community calendars are widely used by residents and tourists. Although you can use a standalone tool to create your calendar, many cities gain this functionality from the content management system that runs their web site. (See "Portals and web sites below.) These days, it's essential that your calendar be accessible via smartphone, not just by print and browser. You can accomplish that via a web site that adjusts to phone screens, or by a separate phone app. a popular aspect of your local government website.

Contracts management. A centralized repository for legal agreements. Typically manages workflow, approvals, alerts, search, e-signatures and contract assembly from a library of clauses. Often interfaces with citizen relationship management software.

Dashboards. Dashboards provide a central spot to monitor a city's key performance indicators (KPIs). In some cases, they are also used to create public-facing "report cards," so citizens can track progress as well. Typical features include connectors to pull raw data from many different sources; visualization and reporting tools to make that data easy to understand; alerts to warn when KPIs go out of bounds; and analytics to spot trends. Most such tools offer both browser and mobile versions.

Like many digital city services, dashboards can be a tool for staffers, for citizens or for both. For instance, Boston city employees have highly detailed dashboards specific to their departments. Boston also combines 18 different performance metrics – everything from graffiti removal to call center performance to emergency response time – into a single CityScore that is reported to the public every day.

I'm constantly looking at the dashboard," said Boston Mayor Martin Walsh in an NPR interview. "I'm constantly looking at the measurements of where we were in a day, where we were in a year. Every single department, every single day."
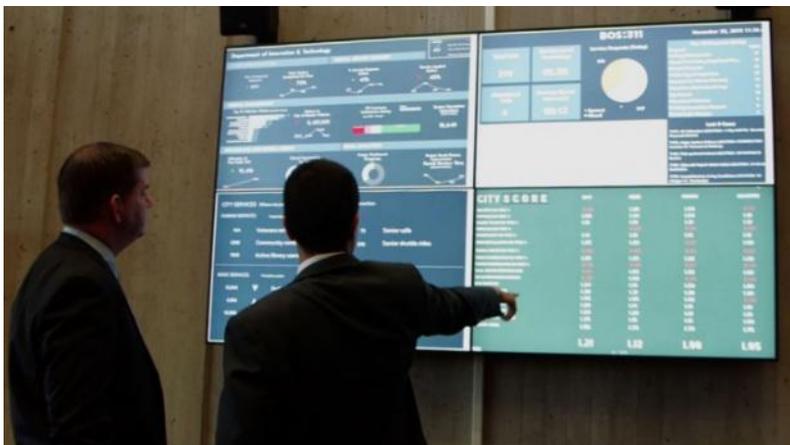
Dashboards help citizens and staffers alike. *The City of Boston has a comprehensive dashboard for the use of the Mayor and his staff. The city also combines 18 different metrics into a daily CityScore, which the public can view at any time.*

Digital payments. There are two main factors in digitizing local government. The first is digitizing interactions between government and citizens – the focus of this chapter. The second is digitizing payments. Although digital payment is a form of city services, it is so important that we have created a separate Smart Payments chapter [6]. For one thing, any city service that includes payments – taxes, fines, fees, etc.– needs a digital component. For another, switching to digital payments can save larger cities millions of dollars. For another, electronic payments produce data that shows trends in how people shop, travel, park and more.

Discovery. Solutions in this category help citizens, workers and tourists find what they need, such as local job openings, day care centers, or restaurants without any health code violations. For instance, Nice, France publishes an Apps Corner [7] web page that lists a variety of discovery apps for tourists. The Houston CareerArc [8] web page alerts job seekers when a position opens up that meets their criteria. (Or residents can install an app on their mobile phones.) New York City's Restaurant Grades [9] web page lets residents scan health inspection results for any of its 24,000 restaurants.

Economic development. Provide citizens and businesses the tools to plan a business (such as the best location for a new retail outlet); to open a business (with a one-stop site for all licenses); to manage a business (with proactive alerts about tax payments, code violations, license renewals, etc.); or to promote a business (such as electronic coupons for residents and tourists). And unleash the software developer community with Open Data (see below).

Inspections and permitting. Top cities are equipping inspectors with tools that get them out from behind the desk so they can meet their constituents to improve services, reduce costs and increase public satisfaction. Key features includes document management, workflow management, and payment processing. And many cities are now providing self-service information too. For instance, the Sacramento Community Development Tracker [10] lets residents see how many applications have been made for building permits, how long it is taking to process them and where the activity is occurring. Users can also track any individual property by entering the address.

"Don't think mobile inspection and permitting is only for large cities and counties," counsels the Center for Digital Government [11]. "Any size jurisdiction can benefit from at least some of these tools. Don't underestimate the importance of improved permitting and inspections to your community and elected officials. These are important functions for any community, and visibility will be especially high." The CDG confirms the need for citizen-centric design. "Include members

of the community in implementation and oversight of the new technology. Corpus Christi made its planning process very inclusive, and complaints about inspection and permitting declined sharply."

Issue reporting and case management. Provide mechanisms for citizens and staffers to report issues; for staff to assign tasks and manage tasks; and for staff and citizens to monitor progress. Create an easy-to-use communication platform that empowers users to access non-emergency services, such as reporting graffiti, flagging unsafe intersections, etc. Track the inquiry's status as it moves through the system, giving residents progress and city staffers insights into common sticking points. Some solutions also have self-help options, such as connecting citizens with experts or with suggested solutions.

Kansas City, Missouri, has a 311 call center that handles about 10,000 calls per week. But it now gives citizens digital ways to request services. They can report issues via social media, or using a special app. Not only have the digital versions improved service and lowered costs, they've also produced valuable data.

"Initially, it was about the input and not so much the outcome," explained Jean Ann Lawson, assistant to the city manager, speaking to Government Technology magazine [12]. Today, however, every 311 user is asked to complete a satisfaction survey. "By pairing 311 data with surveys, we can do a much better job targeting resources." More and more of the city's departments are now using 311 data to measure their performance.

Although there are many fine examples of standalone case management solutions, some cities choose to integrate case reporting and management into their larger citizen relationship management systems (see separate discussion above).

Mobile workforce management. Create work orders, dispatch field technicians, and monitor performance in the field. The best systems support the work cycle from beginning to end: Receiving notifications, booking appointments, creating work orders, creating schedules, assigning crews, tracking vehicles, monitoring status and creating reports for management and citizens. Some systems also automate the process of hiring outside contractors.

The San Jose Water Company [13] uses mobile workforce management from Oracle, a Global Lead Partner of the Smart Cities Council. "Customer service is improved because everyone – from office staff to field staff – knows the status of work," explains its VP of Information Systems Dana Drysdale. "We also significantly improved productivity for field service management, dispatch staff, and field service technicians."

Mobility solutions. Provide residents and visitors tools to help them get around the city – to find destinations; to locate parking spots; and to easily use public transport, including "multimodal" trips (trips that require switching from one mode to another, such as from bus to metro, or from tram to bike share).
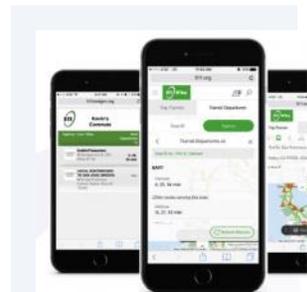
For example, the Bay Area's Metropolitan Transportation Commission (MTC) worked with Council Partner CivicConnect [14] to integrate and manage data from more than 30 transportation agencies. MTC is the planning, financing, and coordinating agency for nine counties and more than 100 cities in the San Francisco Bay Area. It wanted a next-generation 511 system for the area's eight million residents, workers and visitors. (511 was initially a phone hotline for traffic information. Today this information is also available by web or smartphone.)

The new system uses the cloud-based CivicConnect platform to provide multimodal trip planning; real-time departure and arrival times; traffic conditions (including video feeds); parking locations; emergency alerts and much more.

Mobility solutions have multiple benefits. For instance, a multimodal transit app may increase ridership, thereby boosting revenues to the transit operators while also reducing congestion. Likewise, a parking app may increase parking revenues, while also lifting retail tax revenues (because more people are shopping instead of searching for parking).

Mobility app for the San Francisco Bay Area. The region's Metropolitan Transportation Commission (MTC) worked with Council Partner CivicConnect to integrate and manage data from more than 30 transportation agencies into a powerful, mobile-friendly digital service.

Open Data. An Open Data portal is a city service that – done properly – can open the door to dozens or even hundreds of other apps. When cities publish non-sensitive data online, they make it easier for their own employees to find information from other departments – information they can use to build better services. And they make it easier for the private development community to build apps that benefit residents. There are presently 21 million software developers worldwide according to Evans Data Corporation. To successfully compete, cities must enlist that growing community build innovative solutions to city challenges. Launching an Open Data portal is one of the most important things a city can do... so important, in fact, that the Smart Cities Council has created a separate Open Data Guide [15].

Many cities have passed resolutions to be open by default. "Seattle is one of the most innovative and creative cities in the country," said Mayor Mike Murray in announcing Seattle's Open Data portal [16]. "By opening up key city datasets to the public, we make it possible for problem solvers outside of government to get involved in finding solutions to civic challenges." The policy directs that all city departments make their data as accessible as possible to the public, after screening for privacy, security, and quality.

Seattle's Open Data portal now provides more than 400 datasets. That data is used by private companies, journalists, and developers. It also powers some of the city's own tools, including [Open Budget](#) [17], [Performance Seattle](#) [18], the Police Department's [Neighborhood Crime Map](#) [19], and the Department of Transportation's [Capital Projects Explorer](#) [20]

If you truly want the private sector to engage with your data, you'll need to do more than simply dump hundreds of data sets onto a site. Many local governments are therefore creating "themed" data releases or even separate portals for key topics. The City of Austin, for instance, released datasets and a public dashboard themed around sustainability. In its press release, the city framed the dashboard as a call to action: "Beyond guiding City actions, we also hope that the community will use this information to consider how they can support sustainability goals for Austin."

Portals and web sites. "Web portals are a must for the modern municipality," emphasizes the [My City Online](#) [21] guidebook. Indeed, most of the other solutions described in this section use the city's web site as a delivery mechanism; or, at least, as one doorway citizens can use to find and apply for services.

Some cities use [content management systems](#) [22] to create portals to their web services. Others use sophisticated citizen relationship management software to produce all or part of their site. Still others use a purpose-built suite of applications from a company specializing in software for local government.
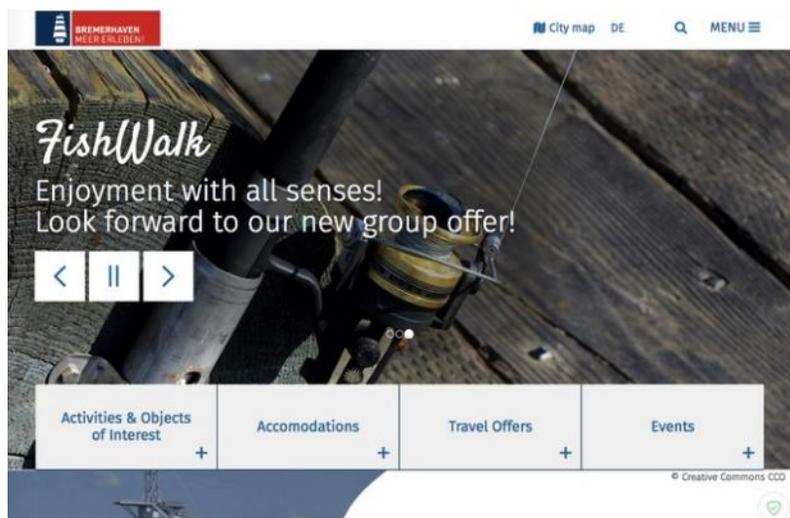
Bremerhaven's portal is available by kiosk as well. The city has roughly two dozen kiosks with up-to-date information for citizens and tourists, including local events, local attractions, and real-time information on public transport.

Public safety and emergency response. Cities everywhere are developing helpful public safety apps for their citizens. Examples include reporting non-emergency crimes by web or smart phone; tip lines to assist the police with investigations; situational intelligence to prepare the first responders before arriving on scene; digital court forms; fire inspection checklists; emergency alerts (for such things as fires, mudslides, floods and power outages); crime statistics; and many more.

One useful source for public safety apps comes from the non-profit Association of Public-Safety Communications Officials International (APCO), whose members include employees of law enforcement, fire, emergency medical services and emergency call centers. It hosts the [AppComm website](#) [23] for reviewing and rating public safety apps. And it has produced a useful two-page PDF file called [Key Attributes of Effective Apps for Public Safety and Emergency Response](#) [24].

For further discussion of the issues and opportunities related to police, fire, ambulance, and disaster planning, turn to the Readiness Guide [chapter on Public Safety](#) [25].

Stakeholder engagement. Stakeholder engagement solutions give cities better ways to "listen" and "talk" to citizens, agencies, businesses, and other constituencies. It is not an exaggeration to say that stakeholder engagement software can revolutionize the way a city collects, analyzes, and distributes information. Employees have more timely, more accurate information for their decisions. And citizens gain a stronger sense of trust and community involvement.

The best solutions address three core tasks: 1) getting better input, 2) providing better output and 3) using analytics to improve the first two jobs.

Most stakeholder engagement solutions provide ways to receive and send alerts and announcements via email, app or text. By offering electronic ways to provide input, government gives constituents an easier way to make their voices heard. Some tools provide easy ways to produce online surveys. Others "listen" to social media to spot trends or to determine where the public stands on a current issue. Some solutions even give staff mobile tools, so they can collect and store information from in-person forums.

Finally, the best solutions also offer back-end tools. Some provide visualization tools – for instance, showing survey results as a chart or on a map. Many solutions also allow the city to manage its stakeholders, either via a built-in dashboard or by interconnecting with citizen relationship management software.

For further discussion of the issues and opportunities related to stakeholder engagement, and disaster planning, turn to the Readiness Guide [chapter on Smart People](#) [26].

Tourism. Apps for tourists have exploded in popularity. Many cities have jumped onto this bandwagon by developing their own apps. By doing so, they give themselves more control over what is promoted and who is included. Some cities even sell sponsorships that allow them to recoup part of their costs. Popular features include:

- **Analytics** – to learn what's working and what's not
- **Audio support** – for cities that want to include audio tours

- **Coupons** and special offers
- **Directories**
- **Integrated advertisements** – for those cities that want to monetize their tourist apps
- **Location aware** – offer different experiences based on the user's location; create maps and tours
- **Multi-channel** – build one app that runs on web browsers or on popular smart phones
- **Multiple language support**
- **Notifications** – push out alerts and reminders for events, offers and issues.
- **Photo galleries** – for cities that want to publish pictures of popular destinations
- **Social media** integration
- **Trip planning**

The New Orleans Tourism Marketing Corporation is a private economic development corporation created under Louisiana State law to foster jobs and economic growth by developing the tourism industry in New Orleans. It produces several web sites and the city's official tourism app GO NOLA [27]. Go NOLA offers a wide range of appealing features, including trip planning; celebrity-narrated walking tours; location-aware listings of music, food, hotel and shopping choices; and social media integration.
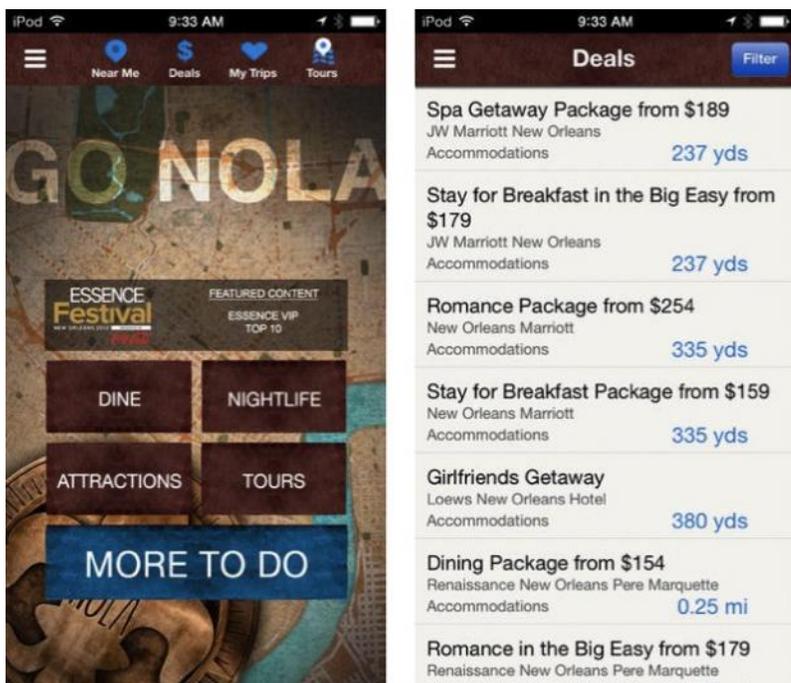
The City of New Orleans official tourist app has a wide range of convenient tools. It also integrates special offers from area businesses.

Best practices for digital city services

Tens of thousands of digital city services are already operating around the world. (The city of Dubai, for instance, has at least 1,500.) This gives us a solid base of best practices to call upon. As you create your own smart city plan, you'll want to keep these success factors in mind: 1) enabling infrastructure, 2) digital by default, 3) customer-centric, 4) key performance indicators, 5) platforms, and 6) partnering.

Install the enabling infrastructure

We cover enabling technologies and essential infrastructure in other sections of the Readiness Guide, so we won't repeat that information here. But it bears reminding that a city must have its digital foundation in place before it can successfully attack digital city services.

"You cannot overestimate the importance of having a solid and efficient ICT-architecture as the foundation," emphasizes My City Online [21], a publication of northern Europe's Smart Cities [28] project, an innovation network between cities and academic institutions. "You can have whatever ambitions you like, if the basic architecture is not flexible and built with communication and interaction in mind you will not be able to deliver your goals."

Likewise, if you do not have a citywide privacy policy, you can easily end up with services that create distrust and pushback. If you do not have a citywide cybersecurity policy, the services you develop could make your city more vulnerable. And if you do not have citywide connectivity, you may end up with services that work only in certain neighborhoods or only for certain groups of people.

Enforce digital by default

In many governments, digital is still an afterthought. But high-performing governments can't afford to treat digitalization as a side project. "Digital by default" is a commitment to deliver all services through digital channels. It was pioneered in the United Kingdom and has since been adopted by dozens of national, state, provincial, county and city governments.The goal is to (eventually) give citizens digital access to every city service.

"Digital services are much more convenient because they can be accessed whenever you want them," explained UK Cabinet Office minister Francis Maude when Digital by Default was launched in 2012. "They are also much more efficient, saving taxpayers' money and the user's time."

In 2012, Britain's Society of Information Technology Management surveyed 120 cities to produce these estimates of the relative costs of delivering services: *Face-to-face:* US$13.84; *Phone*: $4.54, *Online*: $0.24

When they provide services digitally, city governments get a bonus: valuable data. For the first time, they can measure exactly when, where and how customers are using those services.

Be careful – "digital by default" does NOT mean "digital only." Even in the developed world, roughly 20% of the population does not use the Internet regularly. Council Lead Partner Deloitte has a "Deloitte Digital" practice that helps public and private sector organizations make this transition. They caution that governments will need a program to help those that want to go digital but can't because of physical or financial limitations.

"You must support citizens to use online public sector services who can't use them independently," explains Deloitte's Samier Abousaada, "Those who cannot get a broadband connection due to their location, or have physical/mental impairments that prevent them from using computers, have as much right to be served and interact in a low-cost way."

Embrace customer-centric design

Review technology publications and you'll quickly encounter phrases such as "customer-centric" and "human-centered design." These methodologies focus on user requirements at all stages, from planning to design to creation to evaluation to updating. (Less-successful tech solutions are often "capability-centric" – that is, they start with what *could* be done rather than what *should* be done.)

Cities must adopt that same mindset. Today's connected customers expect government services to match their experiences in the private sector. To do that, cities must keep the people they serve at the heart of the process. If handled incorrectly, technology solutions can feel imposed. Citizens may think the city is tackling the "wrong" problem or introducing "technology for technology's sake."

A customer-centric approach starts by uncovering user wants and needs. "How you build is just as important as what you build," explains Nigel Jacob, Co-Chair for the Boston's Office of New Urban Mechanics. His organization is a self-proclaimed "people-centered R&D lab" that tries to "build what people actually want."

How do you know what customers want? One way is simply to ask them, a job that is easier than ever thanks to social media and online surveys. For example, the City of Atlanta started by surveying its citizens to ask them about their problems. From there, the city mapped its smart city objectives. Similar issues emerged, but priorities varied by neighborhood.

Likewise, the City of New York used human-centered design to develop its Digital Playbook [29]. "We met with New York City residents – from diverse backgrounds and from all five boroughs – in their homes and workplaces. We learned about their needs and aspirations for city services. We also spoke with dozens of civic and technology leaders, elected officials, and city government officials and service providers. And we looked beyond New York City to learn from other governments and the private sector."

Journey mapping is one way to better understand users' needs. For example, Gainesville, Florida, mapped all 13 steps of its permitting process to understand the barriers to starting a business. They discovered that users often got lost during the long process, unsure what to do next. As a result, Gainesville created a Department of Doing to guide applicants. They produced a Web portal for guidance, a map shows applicants where they are in the process, and a physical space to obtain all the needed permits.

Crowdsourcing is another technique to promote customer-centric design. A city simply provides a platform to submit ideas, promoting a bottom-up creation process. For example, the U.S. Department of Transportation launched a crowdsourcing platform called IdeaHub.

Public services need to involve customers in the program design, to gain their input, to educate them, and to empower them. Ask yourself:

- **Do you identify all relevant stakeholders** at the earliest stages of planning?
- **Do you have a process to reach out** to those stakeholders to demonstrate the value they can gain from participation? Do you promote collaboration through events, marketing campaigns, and collaborative platforms? Do you reward employees for driving citizen engagement?
- **Do you capture citizen input** and then report back what you've done?
- **Do you monitor your services** to find bottlenecks and fine-tune processes? It is not enough to deliver citizen services. You need to know how the services are used, if service levels are being met, what the choke points are, and how much it is costing. Fortunately, most modern apps have built-in apps and analytics for monitoring progress.
- **Do you inform and empower citizens with Open Data?** (See the separate discussion on Open Data elsewhere in this chapter.)

The 11 characteristics of customer-centric solutions

- **Single account.** *Sign on once for access to any and all city services.*
- **One-time data entry**. *Data is shared between departments so citizens don't have to re-enter information.*
- **Multi-channel.** *Citizens can access services through any and every channel (see nearby illustration).*
- **Self-service**. *Citizens show a strong preference for self-service when possible.*
- **Fully digital**. *Complete the entire interaction digitally. For instance, electronically sign a legal document. Or receive a text notice that repairs have been completed after reporting a pothole via a smartphone.*
- **Personalized**. *Applications "recognize" users, know their preferences and know their key data.*
- **Proactive**. *When something happens, your applications should alert citizens immediately. Such alerts may include warnings (floods, fires, traffic congestion), opportunities (join our town hall next Thursday) or completion notices (the street light at Main and First street has been replaced).*
- **Instrumented.** *Your applications should capture information about how, when and where they are used, so you can continuously monitor and improve performance.*
- **Standards-based.** *Your applications should be built on open standards.*
- **Trustworthy.** *Your solutions should strictly adhere to your citywide privacy and security policies rules.*
- **Social media integration.** *Your apps should allow users to post to Twitter, Facebook, Instagram, etc. without leaving the app.*

Embrace digital inclusion

As life migrates to the digital realm, municipal governments must provide all residents equal access to technology, and to the skills to necessary to benefit. Digital inclusion is vital not just to citizen well-being, but also to economic growth and competitiveness.

As a result, cities such as Seattle, Washington; Portland, Oregon; Austin, Texas; and Louisville, Ky., have laid out digital inclusion plans. But to make digital

inclusion a reality, you'll need your departments to cooperate and collaborate. Kansas City, for example, is at the forefront of such cross-departmental collaboration. The city's efforts have been led by Rick Usher, assistant city manager for small business and entrepreneurship. He told Government Technology magazine [30] that his digital inclusion coalition now includes 30 different entities inside and outside of City Hall.

The public agencies that have done the most to further digital inclusion are libraries and parks and recreation departments. For instance, Philadelphia's KEYSPOT Program includes a number of public computing centers. KEYSPOT was initially funded by a federal grant, and its creation established a physical infrastructure of KEYSPOT centers, including 20 that operate parks and rec buildings.

Other city agencies, including the Office of Adult Education, are helping with digital literacy. More than 700,000 Philadelphia residents visit KEYSPOT centers each year, many of which need help with seemingly basic tasks such as attaching documents to emails.

Enhance with location data

Location data can enhance almost every city service, from crime prevention to pest control to restaurant inspections. Some of that geo-data will come from the city; and some from its citizens.

"One of the most important functions of the smartphone is largely invisible: while we use apps or share messages on social media, our phones are using GPS to encode this data with location information," explains Steven Goldsmith in an article for Data-Smart City Solutions. "Collectively, these mobile devices create a citywide sensing network, producing a rich layer of location data. Cities can make use of this information to learn about issues, push notifications to relevant residents, and provide access to goods and services within a given area."

 In Warsaw, street infrastructure provides location information to the visually impaired. The Virtual Warsaw program uses beacons that connect to smartphones, sharing critical information such as transportation locations and ticket requirements, as well as information about cultural sites.

In New York, the restaurant review platform Yelp has been of particular use. The city analyzes the language patterns in Yelp reviews to identify potential health code violations. Inspectors travel to locations with a higher risk of violation, making more efficient use of their limited time.

In Boston, citizens volunteer the use of their smartphone location data by installing an app called Street Bump. The app collects vibration data to identify patterns associated with potholes. The phone geotags possible potholes and uploads them to the city. Before developing the app for a one-time cost of $80,000, the city had been paying $200,000 every year to drag chains behind trucks to spot pavement problems.

Define and employ key performance indicators

Earlier in this chapter, we presented five key benefits from digital services:

- Increased citizen engagement
- Increased employee productivity
- Increased economic competitiveness
- Increased citizen satisfaction
- Reduced costs

But simply knowing the benefits you want does not guarantee that you'll get them. You must decide how to measure success for each of those benefit areas. Many people refer to these measures as *key performance indicators* (KPIs), *measures of effectiveness* (MOEs) or *metrics.*

To create KPIs, you must determine how to measure success in each area; decide how to collect the information; decide how to present that information (often in highly visual dashboards, as discussed elsewhere in this chapter); and make someone responsible for that collection and delivery.

For instance, Boston's CityScore [31] rolls up key indicators from many departments into 22 metrics that are shared with the public every day. The metrics cover everything from homicides to potholes to trash pickup to satisfaction surveys.

Boston chose to use a standard method so all 22 can be viewed on the same scale: performance divided by target. Thus, a score of one means the city has met the goal; below one means it is coming up short; above one means it is exceeding target.

Cities that would like to build their own dashboard can use Boston's open source CityScore Toolkit [32] as a starting point.

Prefer platforms

Some cities still develop civic applications on a one-off basis. In most cases, however, it is better to seek a suite of applications, ideally one based on a platform the city can use to upgrade existing apps and add new ones. Choose wisely, and you can start small and add on as needed. Such a platform should assist with issues such as:

- **Interface design**
- **Data management** – compiling and managing data in a way that makes it easy to maintain and easy to share between applications.
- **Analytics** – reports and other tools to help you monitor usage and create reports and predictions for the benefit of employees and citizens.
- **Multi-application** use (create many apps from the same toolset)
- **Multi-department** use
- **Multi-channel** delivery
- **Multi-channel payment** – accept payments online, by phone, by kiosk or in-person

As you can see from the list, the main idea is to buy once and then re-use many times for many departments.

Many cities start with a cloud-based commercial suite. Others build their own platform. For instance, the City of Dubai is underway on the Smart Dubai Platform, a "platform as a service" for use by all stakeholders, both within and without the government. It features a unified, single sign-on; secure digital payments; personalized analytics; and access to the city's growing trove of open city data. And with help from Council Lead Partner IBM, the City of Madrid is implementing a technology platform called Madrid iNTeligente (MiNT) that will enable its 3.25 million citizens to instantly communicate issues, receive feedback and track progress.

Prefer partnering

No city should go it alone as it develops city services. It should first seek partnerships from sources like the nine examples listed below.

Other departments within the city. Digital services will not succeed if they simply automate the work of a single department. Providing integrated services is vital for today's digital government.

National, state, provincial and regional governments. The European Innovation Partnership on Smart Cities and Communities [33] (EIP-SCC) brings together cities, industry and citizens to improve urban life. It supports cities with hundreds of millions of euros in grants and challenges. Or consider the State of Illinois and its Smarter Illinois [34] initiative. The state is modernizing its own operations, but it is also developing software, policies and services that can be shared with its cities. And the UK's "Tell Us Once" is a cross-government program to report a birth or death through a single point of contact. Earlier, citizens had to make up to 44 separate contacts with national and local authorities. The central government allowed local governments to opt for the service, decide when to start it, and brand and market it as they saw fit.

Other cities. Many cities now share their work with others. For instance, Chicago's OpenGrid [35] is a web site and mobile app that lets staffers and residents understand what's happening around them. The city has made the source code open, so that developers can suggest improvements and other cities can use it as a starting point. Likewise, Boston has published the code for its Boston.gov web site. "We talk regularly with cities in the region and around the country who are looking to redesign or improve their websites," explains Boston's Chief Digital Officer Lauren Lockwood. "Releasing Boston.gov in the public domain empowers others to reuse the code without building it from scratch."

Developer community. Publishing your source code and publishing Open Data are two ways to involve the developer community, but there are many others. For instance, civic hackathons are short events that gather tech enthusiasts, government workers and citizens to tackle urban problems. They often serve as a launching pad for innovative city services. In the United States, the Code for America non-profit has worked with more than 100 local governments. Review its list for ideas on how to put a hackathon to work [36] for your city.

Local universities and research institutions. A university can act as the city's R&D department and the city can act as a test-bed for the university. For instance, Chicago teamed with the University of Chicago and Argonne National Laboratory for its Array of Things [37] effort, a network of sensor boxes installed around Chicago to serve as a "fitness tracker" for the city. The city-university connection is so important that many regions have organizations dedicated to improving the connection. For example, the Smart Cities [28] project is an innovation network between cities and academic institutions in the North Sea region. In the United States, the MetroLab Network [38] connects more than 35 regional city-university partnerships from around the country.

Utilities. Whether your city is serviced by a municipally-owned utility, or by a separate, investor-owned utility, you will need its cooperation to become smart and sustainable. Most utilities are expert in local (distributed) generation, renewables, microgrids, resiliency and other topics essential to a smart city. In some cases, they may have smart infrastructure in place already, infrastructure that can be shared. For instance, the Illinois utility ComEd has experimented with ways to use its advanced metering network to also carry signals for water meters and for smart streetlights. The Smart Cities Council's Utilities Advancing Cities Task Force [39] is one place to turn for ideas and guidance.

Citizens and their smart phones. Most smart phones ship with cameras plus a dozen or more sensors, ranging from accelerometers to barometers to GPS trackers. In Buenos Aires, citizens use an app to register concerns. The city analyzes the data and, based on the location and the issue, assigns someone to solve it. Similar apps are appearing around the world, allowing citizens to use their cameras and GPS functionality to record potholes and other situations.

Non-profits and non-governmental organizations. Many philanthropic organizations offer grants and programs in support of smarter cities. For instance, Bloomberg Philanthropies [40], supports numerous programs to drive innovation in cities, including What Works Cities, the Mayors Challenge, the Bloomberg Aspen Initiative on Cities and Autonomous Vehicles, the India Smart Cities Mission and more. And some organizations are focused on one particular issue, and can be very helpful in their specialty. For example, the Future of Privacy Forum [41] is a Washington DC-based think tank group focused on issues of data privacy. With support from the Rockefeller Foundation, 100 Resilient Cities [42] has funded Chief Resiliency Officers for 100 cities around the world. Both are members of the Smart Cities Council Advisory Board.

Private sector. There are several ways to partner with the private sector. One is a simple transaction – buying a starter app or suite of apps. The City of San Diego is working with Council Partners Intel, AT&T and Current (by General Electric) to gather information for use by the city and by the private sector. Current [43] will put cameras, microphones and sensors on 3,200 street lights. The system will locate gunshots, estimate crowds, check vehicle speeds and much more. The city will also make the data available to students, developers and entrepreneurs to build applications.

Even if you don't buy applications, it almost always makes sense to seek data partnerships. For instance, Boston and other cities glean data from Yelp (the restaurant review service) to help them decide where to send their health inspectors. And many cities now seek traffic data from companies such as Uber (the ride-sharing service) and Waze (the community-based traffic and navigation app). They use that data to improve traffic congestion and also to improve their long-term planning, thanks to better insights into where people are going and when.

The Food Safety and Sanitation Office of Wake County, North Carolina, USA, conducts sanitation inspections at more than 2,600 restaurants. It now uses social media to disseminate its data in a way that is accessible and useful to consumers. The agency had been relying on the county website to make restaurant scores available, but it knew that accessing the information was cumbersome. So it partnered with Yelp, a popular site for sharing reviews of local businesses. It now automatically pushes its inspection scores to Yelp. The only costs were the minimal staff hours to set up automatic data communication with Yelp's servers.

Next steps

The guidelines from this chapter will give you a head start to a successful digital transformation. If you are new to smart cities, you'll also want to reference other parts of the Smart Cities Readiness Guide. To understand how to prioritize your city services and get them onto your smart city action plan, review the Smart People chapter [26]. For a more detailed look at the underlying technologies, refer to Enabling Technologies for a Successful Smart City. And to be sure your city services are built on a rock-solid foundation, review Foundational Principles for a Successful Smart City.

Your goal is to leverage the digital transformation to reduce the burden on both customers and employees. You won't go wrong as long as you keep these two words in mind: *ease* and *efficiency*. First, focus on making it easy to do business with your city. Second, use this transition to streamline your government to be more efficient, so you can provide *happier for less*.

Links

[1] http://www.denvergov.org/content/denvergov/en.html
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[3] https://www.ksz-bcss.fgov.be/en
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[31] https://www.boston.gov/cityscore
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