

## Gov on the Go

# Boosting public sector productivity by going mobile

William D. Eggers and Joshua Jaffe



# About the authors

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William Eggers is a leading authority on government reform. He is responsible for research and thought leadership for Deloitte's Public Sector industry practice.

His seven books include the Washington Post best seller *If We Can Put a Man on the Moon: Getting Big Things Done in Government* (Harvard Business Press, 2009), *Government 2.0* (Rowman and Littlefield, 2005), *Governing by Network* (Brookings, 2004), and *The Public Innovator's Playbook* (Deloitte Research 2009). His books have won numerous awards including the Louis Brownlow award for best book on public management, the Sir Antony Fisher award for best book promoting an understanding of the free economy, and the Roe Award for leadership and innovation in public policy research.

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# Executive summary

Globalization, advanced manufacturing processes, and a deeper understanding of individual and organizational psychology have all led to huge productivity gains in the private sector over the last couple decades. But the single most significant contribution to this growth in productivity has been the private sector's ability to harness the disruptive power of technology and to use it to invent better and more efficient processes.

The public sector, on the other hand, has been unable to keep pace, despite, in some cases, eventually adopting similar technologies. At the same time that private sector productivity grew, productivity in the public sector actually fell. A *productivity gap* has emerged between the public and private sectors — one widened by government's inability to dynamically absorb and capitalize on new technologies like we've seen in the private sector.

Mobile technology, a very powerful productivity booster, offers the public sector a chance to hit the reset button. It can not only improve internal communications and access to information within public agencies, but also enable the government to fully redesign service delivery by leveraging the power of citizens as co-creators. Mobile presents the public sector with a unique opportunity to drive efficiency and productivity and — at the same time — create vast improvements in the services it provides citizens. To take just one example, our analysis shows that if the U.S. Federal government's adoption of mobile was to double to 70 percent, additional value generated (in terms of government output) could exceed \$50 billion annually.

This report examines three key areas where mobile acts as an *enabler of productivity* for the government and its citizens:

- **The mobile government worker.** Mobile technology not only helps front-line workers do more with less in the face of shrinking workforces and tightly stretched budgets, but also allows them to do their jobs better. No longer constrained by location or time, field workers — human services caseworkers, emergency responders, and law enforcement officers — can operate as truly mobile workers and remain productive on the go.

- **Citizen services 2.0.** Globally, mobile Internet users are expected to exceed desktop Internet users by 2015.<sup>1</sup> Mobile technology offers great promise in making interaction with government easier, requiring less of citizens' time, money, and effort. Myriad mobile applications — from apps that provide basic information on public services to sophisticated sensor- and GPS-enabled, real-time, "thinking" apps — have opened fresh channels of exchange between citizens and the government.

- **Co-creation and co-production: Citizens as the solution.** Mobile technology allows governance to shift from one-way service delivery to a more collaborative, co-designed, and co-created model. As citizens come to play a more active role rather than being passive recipients, public service delivery can be transformed. Greater emphasis on creating solutions *with* citizens rather than just *for* them improves not just service delivery, but also the way the government approaches a problem.

## Making mobile the standard

The effectiveness of mobile in the public sector will depend largely on how it is implemented. These seven steps can help the public sector capture productivity benefits from mobile:

1. Rethink business processes
2. Define the problem you are trying to solve
3. Adopt a "mobile first" approach
4. Focus on user experience
5. Use iterative design: Prototype, test, prototype again
6. Make mobile a source of security, not a threat
7. Define a governance structure

Government agencies aren't the only organizations struggling to adapt to mobile technology. Many private companies struggle with this as well. But if mobile is a challenge, it is also an opportunity: a chance for the public sector to start closing the productivity gap, reassess its business practices, boost its efficiency, and renegotiate its relationship with the public it serves. Used right, mobile can transform government's capabilities.

# Introduction

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“New and potentially transformative practices lose their punch when they are layered on top of existing programs and requirements rather than being used to reinvent business and work processes.”<sup>6</sup>

— Steven VanRoekel, U.S. Federal CIO

Over the past couple decades, new technologies, globalization, advanced manufacturing processes, and a deeper understanding of individual and organizational psychology have buoyed private sector productivity in countries around the world. Despite the availability of many of the same advances, the public sector has not reaped comparable productivity gains.<sup>2</sup>

Desktop PCs — and perhaps even desks — may soon become passé, with laptops, tablets, and smartphones becoming the norm in business. Mobile devices and mobile-infused workplaces are the latest in a long list of technologies transforming private business models and making firms more dynamic. They hold similar and perhaps even greater promise for the public sector. To fully realize the productivity benefits associated with mobile technology, however, government must adopt it differently than it did past disruptive technologies. This change in approach can help governments avoid investments that fail to produce commensurate productivity improvements.

One example of the potential of mobile comes from Nike. The company has worked to strengthen customer engagement after the initial transaction, creating a long-lasting customer experience. To do so, it has introduced a range of Nike+ products that support its customers’ athletic activities through mobile devices and social media. A combination of sensors embedded in the shoe, a mobile device (such as a smartphone or iPod), and the Nike+ website opens up new avenues for value, allowing runners to plan and track their runs, keep records of pace, weather, and terrain, and connect easily to the larger community of runners.

By taking advantage of the ubiquity of mobile devices and allowing users to engage with social networks and share running experiences and tips, Nike has made it possible for customers to co-create a new end product. The firm grew its market share by 10 percent in the first year of this strategy, building a community of 1.3 million participating customers.<sup>3</sup> To date, Nike has added \$500 million to its revenues simply by leveraging its customer base with mobile technologies.<sup>4</sup>

Similar opportunities exist inside the public sector. In the U.S., Amtrak is capitalizing on this productivity-enhancing approach with its Mobile Conductor app. Train conductors can now enter repair work orders and update maintenance schedules, train progress, and scheduled stops in real time. Conductors and staff can use mobile devices to electronically swipe credit cards to sell tickets. Once a passenger is ticketed, the same mobile app allows staff to scan tickets so that passenger manifests can be instantly updated.<sup>5</sup>

Despite numerous bright spots such as this, however, the public sector as a whole has proved less agile in using information technology to thoroughly rethink its business. New and potentially transformative practices lose their punch when they are layered on top of existing programs and requirements rather than being used to *reinvent* business and work processes.<sup>6</sup>

Such halfway measures limit government’s ability to get the most out of new technologies, widening the productivity gap between the public and private sectors.

To reverse this trend, government agencies should adopt the private sector’s practice of using new technology to *rethink and replace* older, less efficient practices.

Mobile technology offers us a chance to hit the reset button. It can not only improve internal communications and access to information, but also allow government to redesign its business model by leveraging the potential of individual citizens as *co-creators*. Mobile offers government a unique opportunity to increase efficiency and productivity and vastly improve its services.

# The public/private productivity gap

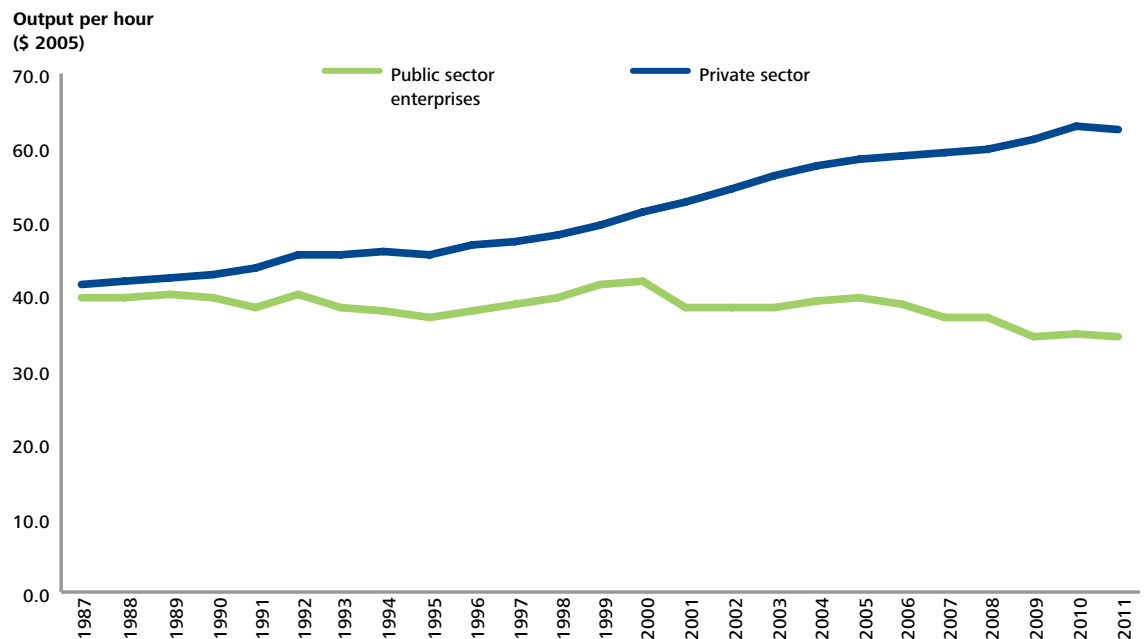
In the summer of 2010, then-U.S. budget director Peter Orszag gave a speech highlighting the growing productivity gap between the public and private sectors. Government too often is inefficient and wasteful, he argued, and Americans are rightly skeptical about its ability to perform effectively. This perception is fueled in no small part by “huge advances in efficiency and technology [seen] both at work and in their daily lives at home,” but *not* in interactions with government.<sup>7</sup>

This was not always true. Until 1987, Orszag noted, public and private productivity were not that far apart. Between 1987 and 1995, however, private-sector productivity rose by an average of 1.5 percent a year, while public sector productivity stumbled along at a 0.4 percent average annual growth rate.<sup>8</sup> Reliable comparisons have been hard to come by since then, because the U.S. Bureau of Labor Statistics (BLS) stopped tracking general public sector productivity. Estimates suggest, however, that private sector

productivity growth has accelerated, while the public sector has fallen further behind.<sup>9</sup> The U.S. private sector produces \$62.7 per hour worked, for example, while government enterprises produce only \$34.5 (figure 1).<sup>10</sup> This represents a net 13 percent reduction in productivity over the past 25 years. This is in stark contrast to the simultaneous 50 percent rise in private sector productivity.

This gap is not unique to the United States. The UK Office for National Statistics estimates that between 1997 and 2007, public sector productivity fell by an average 0.3 percent per year, while private-sector productivity rose by 2.3 percent annually (figure 2).<sup>11</sup> Across Europe, the private sector’s productivity rose almost three times as fast as the public sector’s between 1990 and 2000.<sup>12</sup> Meanwhile, according to the Organization for Economic Cooperation and Development, average government production costs for 34 nations rose from 20.9 percent to 23.3 percent of GDP between 2000 and 2009.<sup>13</sup>

Figure 1: U.S. productivity output: Public vs. private sector



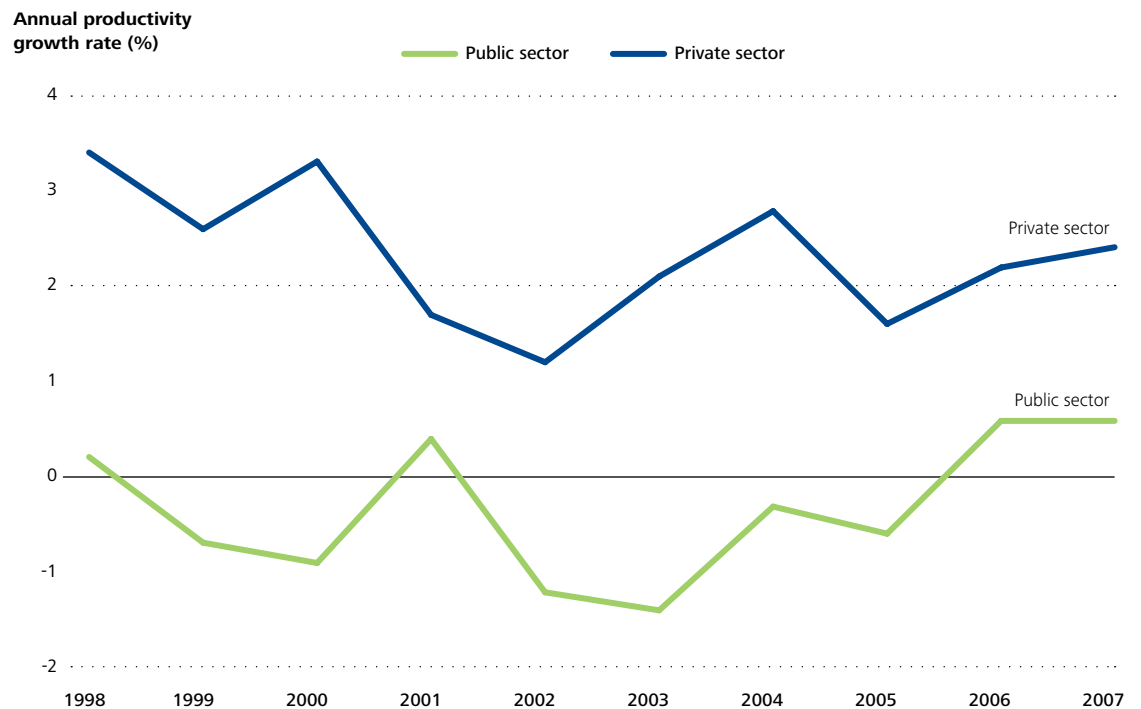
Source: Deloitte Research analysis

Productivity defined as the ratio of GDP contribution to hours worked in public sector enterprises and the private sector.

GDP contribution and hours worked data sourced from BEA and BLS respectively.

Non-profit sector numbers are excluded from private sector productivity calculations.

Figure 2: UK annual productivity growth: Public vs. private sector



Source: Dale Bassett, "Public Sector Productivity: Briefing Note", Reform, April, 2010  
[http://www.reform.co.uk/resources/0000/0318/Public\\_Sector\\_Productivity\\_v2.pdf](http://www.reform.co.uk/resources/0000/0318/Public_Sector_Productivity_v2.pdf)

“The UK Office for National Statistics estimates that between 1997 and 2007, public sector productivity fell by an average 0.3 percent per year, while private-sector productivity rose by 2.3 percent annually.<sup>11</sup>

While management innovations in the private sector and bureaucratic inflexibility in government no doubt play a role in the productivity gap, technology is almost certainly the most important distinguishing element. U.S. Federal CIO, Steven VanRoekel cites the difference in how the private and public sectors deploy IT as the *largest single factor* behind the productivity gap between the private sector and the government.<sup>14</sup>

Simply stated, the private sector generally absorbs technological improvements and captures and capitalizes on the associated productivity benefits more effectively. In fact, information technology adoption has been responsible for about one-third of the growth in labor productivity in the private sector since the 1960s, peaking at 59 percent from 1995–2000.<sup>15</sup> Government — too often constrained by bureaucracy, regulation, and the burden of updating legacy systems — has found it difficult to keep pace with technological change.

Mobile technology offers an opportunity to break this pattern.

# Mobile tech and productivity: The evidence

Mobile devices allow employees to work from any location and remain productive even while on the go. In a recent Forrester Consulting survey of 305 IT decision-makers at companies that use mobile applications, 76 percent cited increased employee responsiveness and decision-making speed as an observed benefit, while 47 percent believe they have increased productivity.<sup>16</sup>

According to a 2008 Intel internal study, a wireless-connected notebook provided more than 5 percent in employee time savings compared to a desktop PC. Intel estimated that its transition to mobile computing delivered a return on investment of \$26 million (three-year net present value).<sup>17</sup> Considering the advances in mobile technology since 2008, a similar study today would likely yield even more compelling results.

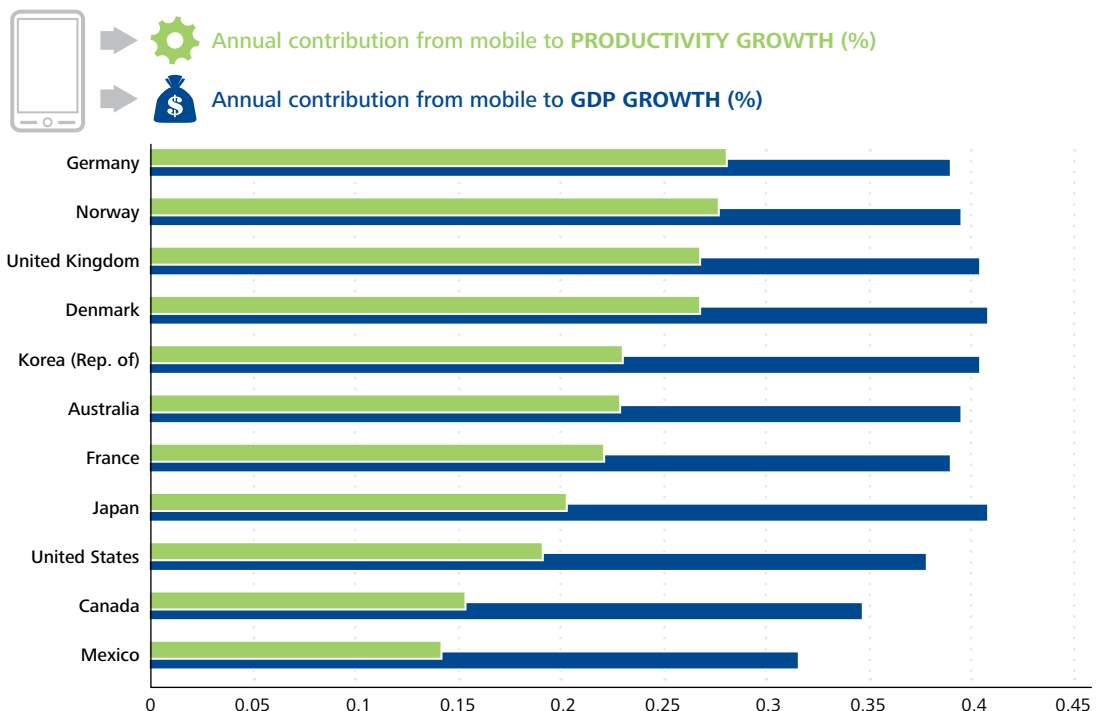
In the public sector, a MeriTalk study estimates that if the addition of smartphones enables workers to be just 10 percent more productive, the U.S. Federal government alone could achieve a \$2.6 billion productivity gain by 2013.<sup>18</sup> This additional productivity could be used, in

appropriate cases, to fill the void left by retiring workers. Take the example of the small subset of U.S. Federal government field workers,<sup>19</sup> where the case for mobile adoption is strong.<sup>20</sup> Here, if a mobile-related increase in productivity were used to offset retirements, it could shrink the pool of planned new hires by more than 10,000. The total salary and pension savings from this productivity increase could exceed \$25 billion.<sup>21</sup>

Academic studies corroborate the link between mobile tech and productivity. A study by the Center for Economic Policy Research found that a nation's mobile penetration correlates closely to its productivity growth (figure 3).<sup>22</sup>

Some government agencies are already realizing some of the potential of mobile technology. The U.S. Air Force has purchased 2,725 iPads to be used as electronic "flight bags" by the Air Force Mobile Command. The iPad eliminates \$1.7 million in printing costs for a paper manual, an additional \$3.2 million per year for maps and charts, and \$770,000 per year in fuel by reducing the weight of the paper material from the aircraft. It has also led to a

Figure 3: Annual productivity and GDP growth from mobile, by country (%)



Source: Harald Gruber and Pantelis Koutroumpis, "Mobile Telecommunications and the Impact on Economic Development," CEPR, October 2010 <[http://www.cepr.org/meets/wkcn/9/979/papers/Gruber\\_Koutroumpis.pdf](http://www.cepr.org/meets/wkcn/9/979/papers/Gruber_Koutroumpis.pdf)>



90 percent reduction in staff hours required to build and maintain charts and maps, along with a whopping productivity increase of 22,000 staff-hours per year. Moreover, safety has improved by reducing the need to manage paper in the cockpit, which impaired situational awareness.<sup>23</sup>

Air Force Maj. Gen. Robert E. Wheeler points out the distinct productivity benefit:

*So we save money [and] we increase the security, but the big power down there is jumping the productivity curve so we can do many more things faster and actually provide more time for our people to think — to do those things that they need to get done and to make those right decisions.<sup>24</sup>*

“The public sector spent a lower share of its IT budget on mobile than every major industrial sector except media and retail in 2012.<sup>26</sup>

**Mobile Savings:  
From New Hire to  
Retirement**

If mobile-generated productivity reduced new U.S. Federal government hires by even 10,000 over a decade, the corresponding lifetime salary and pension savings could exceed \$25 billion.

**Government: a late adopter**

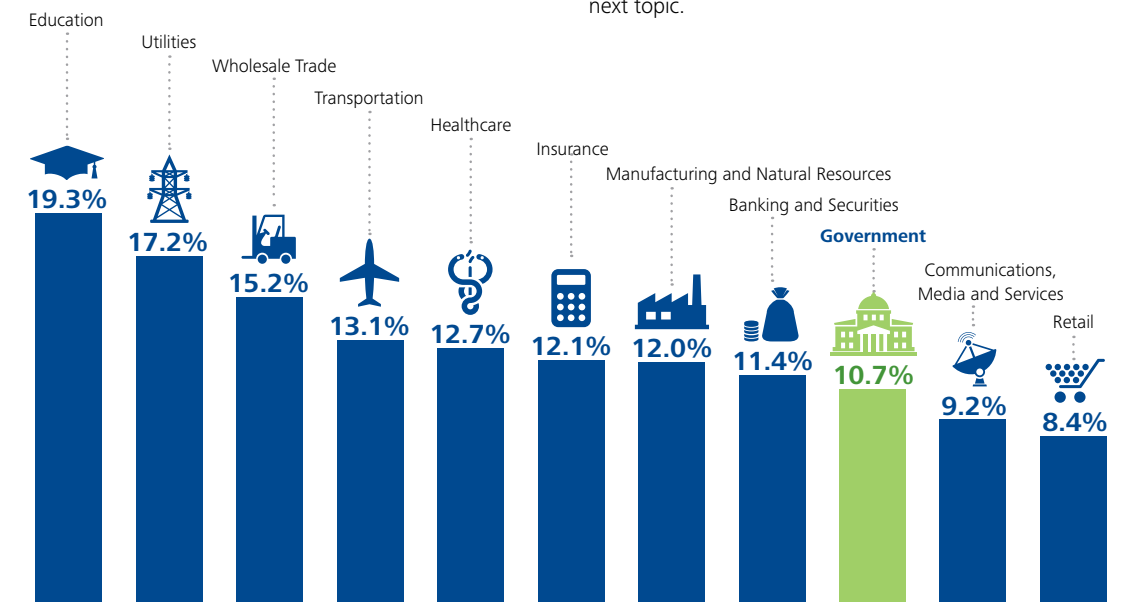
From the telephone to computerization to “balanced scorecard” performance management, government, with the notable exception of the military, typically has been a late adopter of new technologies and business models. Nevertheless, it does eventually adopt them.

Public sector adoption of mobile solutions appears to be following the same trend. As the U.S. Air Force example demonstrates, some governments are already leveraging mobile solutions. According to the United Nations, 25 countries have developed separate mobile government websites and 24 provide the option of making payments via mobile phone.<sup>25</sup> Even so, public investment in productivity-boosting mobile technologies as a whole has fallen behind the private sector’s.

The public sector spent a lower share of its IT budget on mobile than every major industrial sector except media and retail in 2012 (see figure 4).<sup>26</sup>

Still, it appears that the pace of mobile adoption by government is accelerating. A 2012 MeriTalk government CIO and IT manager survey shows significant growth in Federal mobile adoption. In 2013, mobile device usage is expected to rise by 8 percent for smartphones and 12 percent for tablets. In all, the public sector’s enterprise spending on mobile is expected to grow by a compound annual growth rate of 4.48 percent through 2015.<sup>27</sup> Our analysis shows that if mobile adoption rates were to double to 70 percent, additional value generated (in terms of government output) could exceed \$70 billion annually.

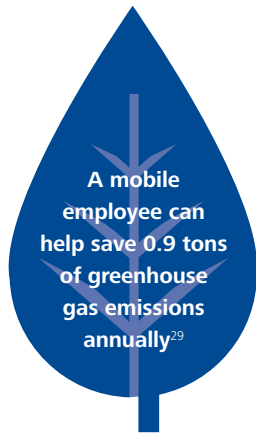
**Figure 4: Global mobile spend by sector (as a percentage of IT spend)**



Source: Gartner, Forecast: Enterprise IT Spending by Vertical Industry Market, Worldwide, 2010-2016, 4Q12 Update, January 2013; Calculations by Deloitte Research

With mobile adoption on the rise, how can government fully reap the benefits of its investment? This is our next topic.

# Harnessing mobile



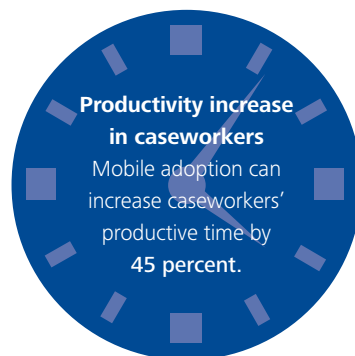
## 1. The mobile government worker

There's no question that many public officials recognize the benefits of mobile. A 2011 survey of U.S. state government CIOs by the National Association of State Chief Information Officers (NASCIO) found that 58 percent of them consider mobile devices and apps either essential or a high priority for government. Public workers are even more gung-ho. As NASCIO puts it, "Even when mobile devices and apps are a priority, states struggle to keep up with state employee pressures to allow them to use personal mobile devices."<sup>30</sup>

Workers recognize that mobile technology allows them to do their jobs better. As the Center for Digital Government writes,

*Far from being an expense, mobile equipment and telework is in many cases more than paying for itself by increasing the amount and quality of work employees can do in the field, reducing government task process time from weeks to days or hours, shortening response time to customers, cutting travel time, decreasing equipment expenses, and eliminating occupancy costs.<sup>31</sup>*

To illustrate the benefits of mobile technology for government employees, we examine three different types of workers who spend much of their time in the field: social services caseworkers, emergency responders, and law enforcement officers.



### Five ways mobile can improve the productivity of government workers

1. Reduce time spent on data entry
2. Enable better situational awareness for frontline employees
3. Enable work from any location
4. Improve accuracy and reduce the effort involved in performing tasks
5. Enhance collaboration and data sharing among employees/agencies

### Social services caseworkers

#### *Freed to focus on what matters*

Caseworkers perform critical tasks with tools that are often barely adequate. Some juggle as many as 80 clients each month. They spend most of their days making home or court visits, and some struggle to keep track of a multitude of intake forms, handwritten field notes, and client birth certificates and drivers' licenses — all containing data they must enter manually into the system.

Mobile solutions can make their jobs simpler, allowing them to operate as truly mobile workers. With laptops or tablets, smartphones, GPS navigation, and wireless access to files, caseworkers can be far more productive in the field (figure 5).

In the United States, the State of Florida has distributed camera-enabled smartphones and laptops to more than 2,300 foster care caseworkers. They can use them to remotely capture time- and location-stamped images and immediately upload them to the state's online database and to enter notes and observations directly, reducing time spent on paperwork and helping them better manage their workloads.<sup>32</sup> The adoption of mobile case management tools in Florida's Miami-Dade County led to a 30 percent increase in home visits, timelier reporting, and better compliance with state requirements.<sup>33</sup>

In a similar vein, nearly 2,000 Swedish homecare workers use smartphones to document the status of more than 30,000 elderly patients in Stockholm. With the instantaneous digitization of case information, Stockholm's city government can more easily offer services to its elderly citizens, improving service delivery as well as efficiency.<sup>34</sup>

Figure 5: The mobile-equipped caseworker

## HOW MOBILE TECHNOLOGY CAN IMPROVE PRODUCTIVITY AND JOB SATISFACTION AMONG CASEWORKERS

Efficient mobile tools **IMPROVE PRODUCTIVITY UP TO 45 PERCENT**. This enables more time to be devoted directly to casework, increasing job satisfaction and reducing turnover.



Source: GAO, HHS Could Play a Greater Role in Helping Child Welfare Agencies Recruit and Retain Staff, <<http://www.gao.gov/new.items/d03357.pdf>>  
 ABC News, "Experts: Losing Foster Kids Is Easy," June 5, 2012, <<http://abcnews.go.com/US/story?id=91590&page=1#.UleYfWct1LZ>>  
 AT&T, "Our Kids of Miami-Dade Case Study," <[http://www.wireless.att.com/businesscenter/en\\_US/popups/video/our-kids.jsp](http://www.wireless.att.com/businesscenter/en_US/popups/video/our-kids.jsp)>

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#### Emergency responders

##### *Enhancing situational awareness, speeding inspections*

Firefighters *must* be fast and agile in the field. California's Novato Fire Department District uses tablets to provide real-time data to incident commanders. Mobile applications related to mapping, hazardous materials, weather, wilderness firefighting, and satellite imagery all enhance firefighters' situational awareness, leading to better decisions when lives are at stake.<sup>37</sup>

Inspections are a vital component of a firefighter's job and a critical factor in fire prevention. Before the use of mobile technology, fire inspectors would take paper notes during inspections and later enter them manually into a database.

"It was a time-consuming and costly process, because reports could go back and forth several times for a simple spelling or data error, and every revision meant another piece of paper," says Glenn Wallace, a platoon chief in the fire department in Mt. Lebanon, Pennsylvania. "Re-inspections that should have taken place within 30 days of the original inspections were taking up to 70 days because of the back-and-forth paper shuffling."

By reengineering the time-consuming review process through the use of tablet PCs, the department has saved 300 hours a year on administration, improved inspection turnaround times, and boosted inspection volume by 50 percent. This in turn has cut the number of chimney fires.<sup>38</sup>

#### **In developing nations, simple text apps can save lives**

- **Bloodbank SMS.** This mobile app allows medical workers at Kenyan district hospitals to provide information about their remaining blood supplies directly to their centralized blood bank. They simply text a free message to the service citing the amounts of each blood type remaining. If blood levels at a local hospital drop below a critical threshold, the system automatically sends SMS alerts to the central blood bank, keeping it updated about where blood is needed most.<sup>35</sup>
- **Mobile Demographic Surveillance System.** Kenya's medical field workers also can conduct surveys via mobile phone and remotely transmit the data back to the hospital's database. Shifting the system from paper-based surveys to mobile phones allows field workers to avoid the time-consuming and potentially error-prone process of data transcription.<sup>36</sup>

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## Inspectors in Hong Kong, China, use mobile devices to review past inspection results and to submit new inspection reports from the field, increasing productivity approximately 10 percent.<sup>39</sup>

### Law enforcement officers

#### *More aware, more effective, more in control*

Mobile technology also helps law enforcement officers improve their productivity in the field. Officers can use mobile devices to access central information systems like the U.S.'s Federal Criminal Justice Information System; update incident reports in real time; view images of missing children and suspect fingerprints or photos; run drivers' license checks; access case records, incident reports, and call histories during field investigations; stream video traffic from dashboard-mounted cameras; and issue e-tickets, among many other tasks. Mobile access to critical data can save officers' time — and their lives — by improving situational awareness and helping them more easily identify potentially dangerous suspects. By viewing police records on their mobile devices, they can match a suspect to his or her picture and view information on prior offenses.

#### Mobile savings for law enforcement

Mobile data access can help officers save **30 minutes** every day.

Assuming that half of the 636,410 officers in the United States lack access to this technology, adopting it could save them more than **50 million hours or \$1.3 billion** in money terms.

**Mobile data access for effective response.** In Australia, Sydney's Rangers use iPads to fight disabled parking fraud. While making on-street checks, they can access the state government database of the Australian Disability Parking Scheme to identify vehicles using cards that have been lost, stolen, destroyed, or revoked.<sup>40</sup> In the city of Baltimore, mobile data access saves each officer an estimated 30 minutes per day by eliminating the time needed to obtain information from a dispatcher.<sup>41</sup> Assuming that half of the 636,410 law enforcement officers in the United States lack mobile data access, adopting this technology could help them save more than 50 million hours, equivalent to \$1.3 billion annually.<sup>42</sup>

**Faster decision-making.** Mobile surveillance applications allow officers to access live camera feeds on smartphones, tablets, and other mobile devices. In Albuquerque, New Mexico, for example, police use mobile devices to view live images and remotely control cameras mounted on mobile surveillance units. These can be deployed to time-sensitive, critical situations such as negotiations with hostage-takers or other SWAT emergencies. The system allows experienced officers to stay on top of events and provide appropriate guidance instantly, regardless of their location.<sup>43</sup>

Contrast these new abilities with the burden faced by officers who still must write out paper tickets, take handwritten notes, and spend hours in the office on paperwork instead of patrolling the streets. The contrast highlights an endemic problem: the technology gap among different governments. Disparities in the adoption of new technologies among agencies, states, and municipalities can limit their overall ability to achieve public sector productivity gains.

Figure 6. Telework savings and government

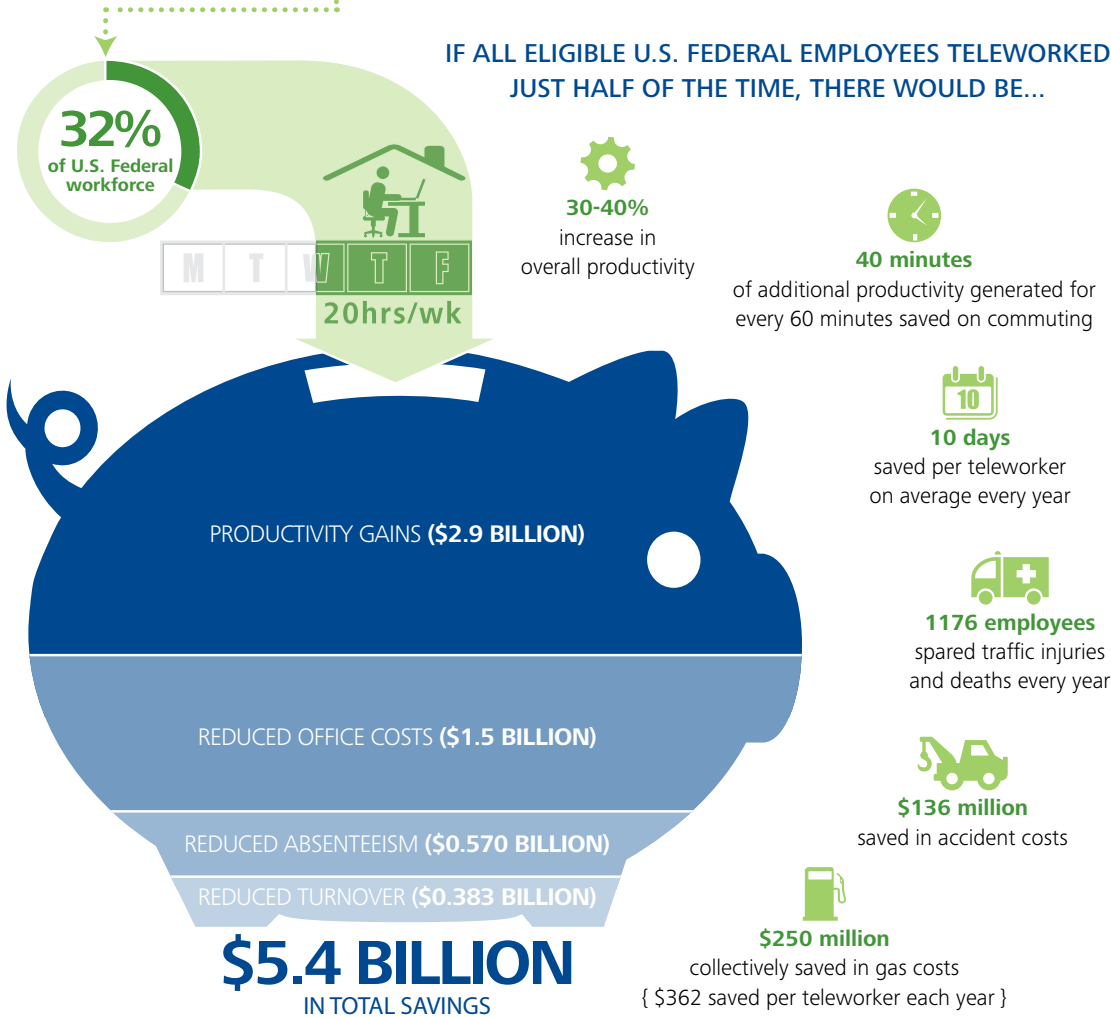
**TELEWORK SAVINGS = \$5,400,000,000**

According to the 2012 Federal Telework Report, only **7%** of U.S. Federal government employees telework.



YET APPROXIMATELY **32%** OF THE U.S. FEDERAL WORKFORCE IS **ELIGIBLE TO TELEWORK**.

IF ALL ELIGIBLE U.S. FEDERAL EMPLOYEES TELEWORKED JUST HALF OF THE TIME, THERE WOULD BE...



Source: Deloitte analysis

## How mobile helps governments around the world

### Augmented reality apps for urban planning

In **Finland**, augmented reality (AR) planning tools are allowing city officials and residents to, via smartphone or tablet, visualize a geometrically accurate impression of a finished structure on the actual development site. This is helping public planners and city councils make better decisions. The VTT Technical Research Centre of Finland developed the AR application, which was used to present Helsinki officials with a virtual sketch of a proposed tower block and hotel, Kämp Tower, on the project site. This could be viewed via a mobile device. VTT is working on a version of this software aimed at the public and that could include a voting function for people to register their opinions on a project.

**Source:** The Guardian, "Augmented Reality Adds a New Dimension to Planning Decisions", May 18, 2012, <<http://www.guardian.co.uk/local-government-network/2012/may/18/augmented-reality-planning-applications>>

### Engaging citizens to help fight crime

Mobile can be an effective medium for government to reach out to citizens and seek their participation. For instance, the **London Metropolitan Police** crowdsourced the identities of 2,880 suspects from last year's riots using a smartphone application. The police asked citizens to download the *Face Watch ID* app and help identify the persons through images taken from CCTV footage. If an image is known to them, citizens can enter the name or address of the person, which is sent to the police immediately and confidentially. Societal goals are met — and, also, citizens are engaged as a solution to shared problems.

**Source:** Metro News Reporter, "London Riots: Metropolitan Police Use Facewatch ID App to Identify Suspects", June 12, 2012, <<http://www.metro.co.uk/news/903293-london-riots-metropolitan-police-use-facewatch-id-app-to-identify-suspects#ixzz2ADDeLH4L>>

In Australia, the share of citizens using mobile devices to interact with government doubled in just two years, and 35 percent of them used a mobile app at least monthly.

## 2. Citizen services 2.0

While citizen satisfaction with government rises and falls — according to the American Customer Satisfaction Index, satisfaction with the Federal government rose in 2011 after a two-year decline<sup>44</sup> — one trend has held: Customer satisfaction with e-government has risen steadily, currently scoring 75.2 on a 100-point scale.<sup>45</sup>

This satisfaction is driven by widespread and growing adoption of e-services. In Australia, for instance, the share of citizens using mobile devices to interact with government doubled in just two years, and 35 percent of them used a mobile app at least monthly. Of those surveyed, citizens who used government e-services were consistently more satisfied with outcomes than those who contacted the Federal government via older methods such as mail or telephone; only in-person contact ranked higher than electronic service.<sup>46</sup>

**Reduce productivity losses.** Urban dwellers around the world face an everyday predicament: finding a parking spot. The frustrating experience of endlessly circling the block searching for an empty space costs drivers — and society as a whole — more than one might imagine. Drivers looking for a parking spot in one district of Los Angeles drove an estimated 950,000 miles a year, equivalent to four trips to the moon.<sup>47</sup> According to San Francisco officials, drivers searching for parking spots generate 30 percent of all downtown congestion.<sup>48</sup> On average, Americans waste 3.5 to 14 minutes a day looking for parking, or up to 85 hours a year.<sup>49</sup> With more than 210 million licensed drivers in the country, this amounts to 17.8 billion hours annually.<sup>50</sup>

Mobile technology may hold the answer to the problem. The U.S. city of San Francisco is leading the way with a \$20 million parking program known as SFpark. The city has placed sensors in 7,000 metered parking spots and 12,250 spots in city garages. As spaces open up, the sensors communicate wirelessly with computers that immediately disseminate the information to mobile app users. The app's color-coded map shows which blocks have open spots and which are full, saving users time, mileage, and stress. A similar concept is being piloted in the UK.<sup>51</sup> A privately developed app, Parkmobile, allows drivers to pay for parking via mobile phone in cities across the United States, a quicker and more convenient option than conventional means.



### Savings from Mobile Parking Apps

The average American wastes 3.5 to 14 minutes a day looking for parking, or up to 85 hours a year.

With more than 210 million licensed drivers in the country, this amounts to 17.8 billion hours lost annually.

Mobile parking apps can help citizens save this time, worth about \$391 billion to the economy.

**Improve results.** The Manchester, New Hampshire police department has worked with New Hampshire-based Ping4 to establish “hyperlocal” areas — a process called “geo-fencing” — that gives users with the proper app a text alert when they enter the area. These alerts can provide anything from offers from local merchants to critical announcements about a lost child or a gunman on the loose. The department has used the system to remind customers who park in a downtown lot prone to auto break-ins to lock their doors, cutting the incidence of theft by 40 percent.<sup>52</sup>

**Make information accessible.** Citizens rely on government for critical information. Mobile apps and mobile-enabled websites make it much simpler for citizens to obtain information and instructions when they need them. Two examples from the United States are the Internal Revenue Service’s (IRS) popular IRS2GO app for tax-filing instructions and the Transportation Security Administration’s (TSA) My TSA app for flight and travel information, including security rules, real-time delay updates, and wait times.

### Potential Savings from 311 apps

New York City receives more than 20 million phone calls for 311 complaints.

If half of these complaints were to shift to the mobile app medium, the city would save \$50 million in call center costs.

In the United Kingdom, the National Health Services’ “Choose Well” mobile app provides citizens with information on a range of health services, including pharmacists, general practitioners, optometrists, dentists, minor injury units, and emergency departments. It helps patients choose the most appropriate care based on severity and indicates options nearest to them on a map. This reduces pressure on emergency departments and reduces treatment time.<sup>53</sup>

Similarly, a number of Australian states have created mobile health apps to help patients and caregivers make better-informed decisions. New South Wales’ mobile site provides critical information such as closest hospital location, best travel routes and estimated drive times, number of waiting patients, number of beds, and estimated wait times.<sup>54</sup> Victoria’s citizens use the Better Health Channel app to receive a quick diagnosis, call a nurse hotline, or find a practitioner in their area.<sup>55</sup>

### Achieve more for less by leveraging citizen efforts.

Governments can harness the potential of mobile technology to crowdsource information, improving their services while saving taxpayer dollars. Cities depend on citizens to help them locate and resolve everyday

complaints such as graffiti or potholes. But citizens often find the task of reporting these issues burdensome. Many cities across the United States are turning to simpler and more economical options via mobile apps. New York’s NYC311 mobile application, for instance, allows its users to report street potholes, damaged street signs, graffiti, and other quality-of-life issues. The GPS function available on most smartphones simplifies the entry of address information. The city receives more than 20 million 311 phone calls every year.<sup>56</sup> If even half of these complaints were to shift to the mobile app, callers would save 513,888 hours of their own time, equivalent to \$11.3 million per year. Furthermore, since the average 311 call costs the city \$5 in administrative costs, mobile submission of these calls could trim as much as \$50 million from its budget.<sup>57</sup>

This approach can be even more effective when it is combined with mobile use by city workers. In 2009, Boston created Citizens Connect, an app allowing citizens to report nuisances and problems via their smartphones. In 2012, the city followed up with City Worker, a program that puts smartphones in the hands of its public works employees and alerts them to trouble spots reported by Bostonians. Now workers can resolve these problems even faster.<sup>58</sup>

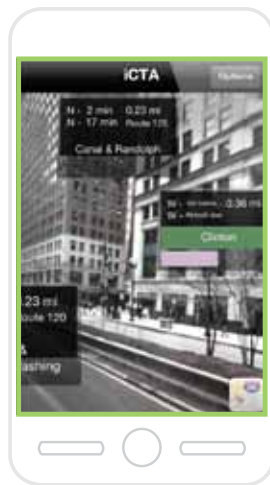
**Improve citizen engagement.** The city of Brampton, Canada uses a custom mobile app to track the number of people who attend city events. City officials can use the real-time data generated by the app to identify which parts of the city have the lowest participation, so they can address citizen engagement in underrepresented areas.<sup>59</sup>

Salt Lake City’s building inspection department has made it possible for its inspectors to send inspection results — and required changes — directly to customers’ smartphones. This reduces the time needed for administrative processing and allows contractors to make necessary changes quickly, or move on to the next phase of construction without delay.



Figure 7: Mobile transit apps for easier commuting

## MOBILE TRANSIT APPS FOR EASIER COMMUTING



### CHICAGO TRANSIT AUGMENTED REALITY (CTAR) APP

The app overlays your phone's camera image with real-time information on which train/bus is arriving where and when.

FEATURES:



### TIRAMISU

Tiramisu is a crowdsourced app that lets users track buses in real time and provide other users with dynamic information about the location of a bus and its vacancy.

FEATURES:



NEXT BUS ARRIVING IN 10 MINS.



### TEXT MY BUS

This app lets users know when their bus will arrive via text message using Detroit Department of Transportation's real-time bus tracking information.

FEATURES:



### APP FEATURES



**Enhance customer experience.** Mobile technology is helping governments identify customer service gaps or limitations and reduce them. Beneficiaries of the Supplemental Nutritional Assistance Program (SNAP), the Federal program once known as “food stamps,” can now use SnapFresh, a text-message and mobile web app that helps aid recipients use a website or their cellphone to find places nearby that accept SNAP benefits. SnapFresh also attempts to help recipients make healthier food choices by providing information about the type of store in the results, such as whether a location is a full grocery store or a corner convenience store.

While SnapFresh was created by a non-profit called Code for America, government agencies are also developing mobile apps along similar lines to address customer service gaps. For example, the Australian Government’s Express Plus Students mobile app allows students receiving benefits like youth allowance to report income, apply for advance payments, locate service centers and carry out multitude of other functions.<sup>60</sup> Other programs, such as the Federal Communication Commission’s Lifeline Program, help to ensure that the poor have access to mobile technology, providing subsidized mobile phones and subscriptions to individuals on programs such as SNAP, Medicaid, or SSI. In the past three years, the program has gained 12 million participants.<sup>61</sup>

### 3. Co-creation and co-production: Citizens as the solution

Mobile technology allows government to shift from a one-way service delivery approach to a more collaborative, co-designed, and co-created model. The involvement of citizens can transform public service delivery.

*Co-creation* is an approach to public services design focused on creating new solutions *with* people, rather than *for* them. Mobile technology can expand the available options for public policy and service design. Governments can use it to communicate with citizens across geographic or organizational boundaries and foster interactions that result in new ideas and solutions.<sup>63</sup>

*Co-production*, similarly, involves identifying and mobilizing citizen resources, delivering services *with* rather than *for* service users.<sup>64</sup> Mobile technologies have emerged as powerful, effective enablers of co-production.<sup>65</sup>

#### Co-creation

The growth of mobile and associated technology has encouraged young developers to develop innovative solutions for challenges faced by the government.

Many agencies understand this. The U.S. Centers for Disease Control and Prevention (CDC) sponsored a “Flu App Challenge” to encourage mobile app developers to create an application using publicly available flu data. The winning app, “Flu-Ville!”, uses a gaming model to increase user engagement. Flu-Ville! taps the CDC’s influenza activity report, which reports the amount of flu activity in each state, and lets players build their own city and manage outbreaks of the flu. Through such events, agencies can engage citizens and reap a host of creative ideas.

The value and potential of such ideas is far greater than the prize money paid out. For instance, the City of New York estimates it received \$10 million worth of innovative ideas for just \$20,000 in prize money when it used ChallengePost, a crowdsourcing portal, to seek ideas for mobile apps to improve city transport.<sup>66</sup> One winner, Roadify, uses a base of transit schedules, service delays, and other official information, then layers on crowdsourced comments on real-time conditions, along with Tweets and other information, to help transit riders know moment by moment what their commute will look like. Boston’s MBTA system showcases user-designed apps that help smooth out Bostonians’ daily commutes. Instead of designing an app,

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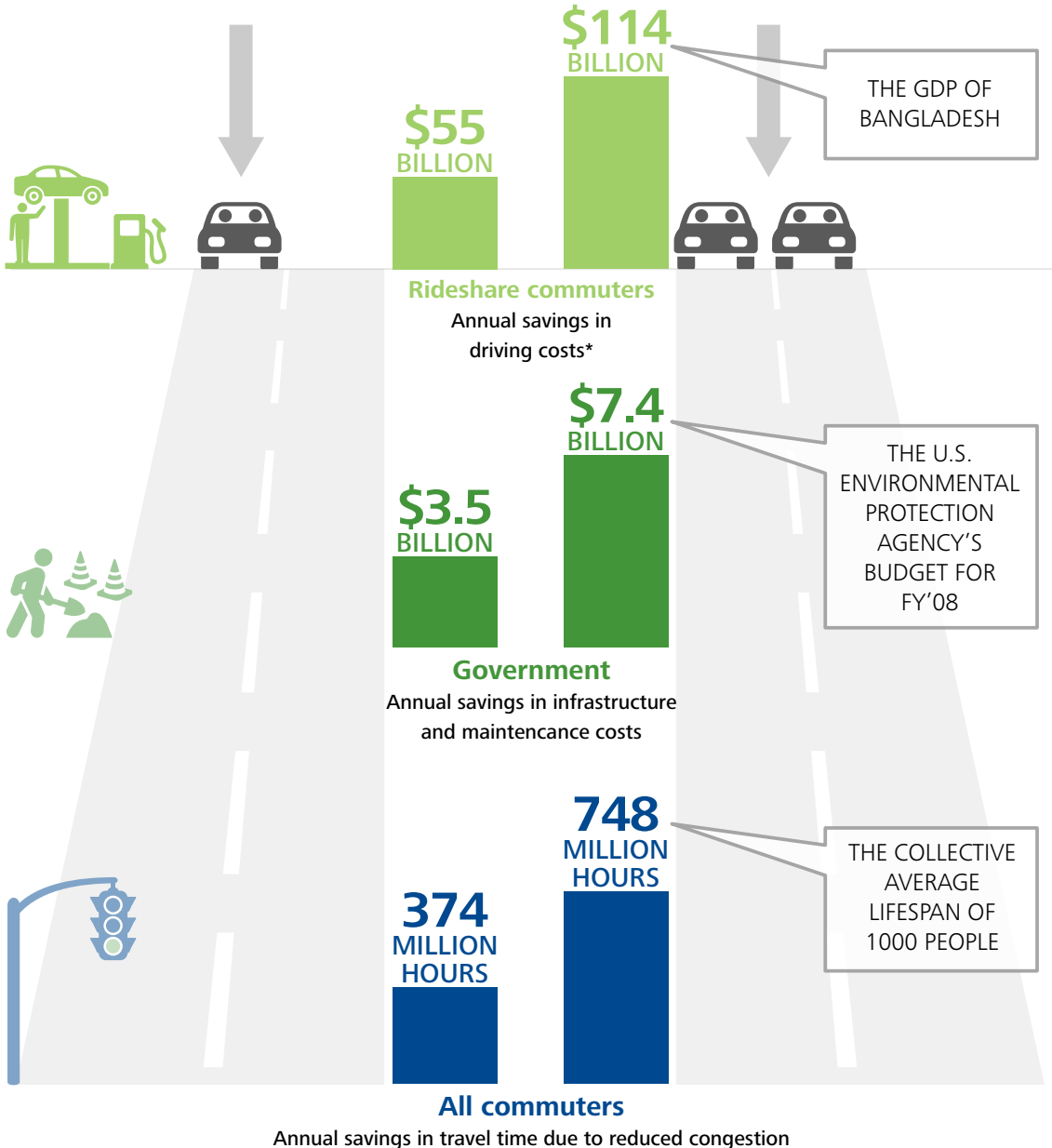
In Denmark, citizens no longer need to stick physical stamps on letters. They can simply send a text message to receive a postage code that can be put on the envelope in place of a stamp. This convenient system cuts out the post office queue by adding the cost of postage to the user’s cell phone bill.<sup>62</sup>

Figure 8. Benefits of ridesharing

## ANNUAL SAVINGS FROM RIDESHARING

Currently, there are **13.5 million** commuters that rideshare in the United States.

**If twice as many** commuters used ridesharing in the United States, the savings would be...



\*Including fuel, maintenance, tires, insurance, license and registration fees, depreciation, and finance costs.  
Source: Deloitte analysis

MBTA outsourced the design process to its citizens, giving residents access to its public transportation system data via the MassDOT Developers web portal.<sup>67</sup>

**Build solutions that can be shared.** The nonprofit Code for America connects developers with local governments to encourage the development of applications to solve civic problems. The resulting applications are open source and can be adopted by any city. And again, Bostonians are catalyzing the effort. Residents there built an app that allows its users to “adopt” fire hydrants and volunteer to clear snow away from them after winter storms. Citizens use the app to report when they have cleared the snow. The city tracks participation using GIS, allowing it to better direct limited city manpower.

This novel idea is being shared. The City of Honolulu’s IT director, Forest Frizzell, found the Adopt-a-Hydrant project on Code for America’s public code repository. He decided to customize the app and use it to encourage Honolulu residents to maintain tsunami sirens on the beach. Now citizens with a smartphone or a Web browser can check the sirens, ensure that they have batteries, and record their findings.<sup>68</sup>

Every city has an army in waiting of concerned citizens, eager and willing to do their part for a safer and better city. Technology is the spark that makes it possible for them to translate that will into *action*.

### Co-production

**Search and rescue.** Mobile technology can also change the way in which government approaches a problem such as emergency response. As noted earlier, the Manchester, New Hampshire, police department has recognized this potential with its “geo-fencing” capability.

“If we’re working at a [sports] game and someone tells us their son Johnny’s lost, we can put it out and do a geo-thing right around the stadium, and instead of having three officers looking for him ... we’ll have 6,000 [people],” Captain Nick Willard told reporters.<sup>69</sup>

**Turning a car into a bus route.** Traffic management is another fertile venue for co-production. Mobile technology makes it possible for drivers and transit riders to do quickly what government can only do indirectly: change their own travel behavior. New transit apps, many of them created by ordinary citizens, provide real-time information on different public transport options as well as routes and wait times (see figure 7). More sophisticated programs aim to add in ridesharing, car-sharing, and bike-sharing options.

A small “deprivation study” by Latitude showed that access to real-time mobile information can raise public willingness

to use other forms of transit. Fifteen of 18 participants felt they could continue to go car-free if they had easy access to information on transit options.<sup>70</sup> Having this information at their fingertips allows citizens to make better transport decisions, such as increasing ridesharing, without requiring new infrastructure (figure 8). If the number of ridesharers were to double, the U.S. government would save \$9.8 million each day on infrastructure maintenance costs.<sup>71</sup> The growing ability of ridesharing companies to use mobile apps to pair drivers and riders will almost certainly boost these numbers.

In the wake of Hurricane Sandy, New Yorkers adapted to limited public transportation options and temporary restrictions on bridge and tunnel crossings by flocking to the Internet. Several car-sharing and ridesharing services, including Carpingo and Ridepost, waived fees.<sup>72</sup> Other New Yorkers left the driving to others entirely, using websites like Craigslist to find rides in and around the city. According to a story on Mashable, commuters even tapped into their “social networks to fulfill the three-passenger minimum for cars entering Manhattan issued by Mayor Michael Bloomberg.”<sup>73</sup> This move allowed citizens to get around while still complying with the government’s temporary restrictions on bridge and tunnel crossings.

**Generate real-time traffic reports.** The mobile navigation app Waze uses live feedback from its driver network to generate real-time traffic reports, and adjusts its route recommendations accordingly. Simply by avoiding congested areas, mobile-enabled drivers are co-creating a better travel experience.

**Provide first aid.** San Jose, California residents can help save lives by using the Pulse Point mobile app. The application allows members of the public to provide life-saving assistance to victims of sudden cardiac arrest. App users who have indicated they are trained in CPR can be notified if someone nearby is having a cardiac emergency. The app uses sophisticated location-based services to alert citizens in a public place of the need for CPR and also directs citizen rescuers to the exact location of the nearest publicly available defibrillator. The app is being used through a partnership between the San Jose Fire Department and El Camino Hospital, and will be made available to additional communities in Santa Clara County over the next year.

Apps such as Pulse Point, which encourage qualified citizens to sign up and participate, will result in faster and more effective emergency response without devoting significant new resources. Their widespread use could also help public health officials reduce the nearly 1,000 deaths per day caused by sudden cardiac arrest.<sup>74</sup>

# Implementation: Putting mobile to work

Realizing significant productivity benefits from mobile tech often will require an infrastructure designed to *replace* rather than duplicate existing processes and technologies.

The enormous potential of mobile technology is clear. But e-government and other, earlier technologies also had great potential; yet governments generally failed to capture the promised productivity gains. These steps can help mobile tech avoid the fate of earlier government technology adoption.

## Rethink business processes

To realize a big productivity impact from mobile tech, governments will have to *change the work*. Mobile can reach its potential when public agencies use it to redesign their business processes and eliminate steps altogether. Simply switching from paper-based processes to digitized ones is helpful, but more is possible. Boston, for instance, has developed a Street Bump app that uses driver smartphones' accelerometers to identify potholes and automatically report their precise location via GPS. The city hopes to save money and eliminate the need for engineers to painstakingly survey its 806 miles of roadway.<sup>75</sup> The \$80,000 development cost was less than half of what the city spends on this task every year.<sup>76</sup> By redesigning its business approach to include citizens, governments can streamline operations and cut costs.

Boston has made the app available to other cities, but there are other ways of building on its potential; technology deployed for a particular cause can be modified for a host of other situations. For instance, Street Bump's algorithm might be tweaked to report where cars often speed through intersections and to predict where crosswalk paint has faded, lights are burnt out, or stop signs are obscured by overgrowth.<sup>77</sup>

## Define the problem you wish to solve

Productive organizations don't "go mobile" for its own sake. They have a compelling business objective that mobile solutions can further. Government agencies should analyze how mobile can address their specific challenges.

When Michigan's Department of Natural Resources launched its Mobile Fish app for last-minute fishing licenses, it was solving a problem — the delay in recouping its money when licenses are purchased from third-party vendors. The agency is partially funded by user fees and cannot afford to let these fees linger in other people's hands. Mobile Fish has made the licensing process quicker and more convenient for both government and citizens.<sup>78</sup>

Productive organizations don't "go mobile" for its own sake. They have a compelling business objective that mobile solutions can further. Government agencies should analyze how mobile can address their specific challenges.

## Adopt a "mobile first" approach

A mobile first strategy means making mobile tech a *priority* instead of an afterthought, to fully capitalize on the medium's growth and capabilities. It means leading with mobile apps and products, rather than treating them as enhancements or add-ons. As one analyst explains, "Focusing on mobile provides an opportunity to skate to where the puck is going."<sup>79</sup>

This year, when U.S. Environmental Protection Agency CIO Malcolm Jackson announced an agency-wide mobile first policy, he emphasized that mobile access is rapidly becoming the primary way in which people seek government information. "I'll tell you why we are doing it — a lot of people cannot afford personal computers or Internet service," he says. "But they can afford smartphones, and they do not leave home without them."<sup>80</sup> The policy also applies to the agency's development of internal solutions; after mobile deployment, new solutions are expected to be re-imagined and implemented on desktop and notebook computers.

A mobile-first policy should not apply only to new applications, however. Realizing significant productivity benefits from mobile tech often will require an infrastructure designed to *replace* rather than duplicate existing processes and technologies.

It's also important to understand that *responsive design* is the foundation of a winning mobile strategy. As a speaker at DigitalGov University's webinar on mobile-first approaches pointed out, "Another paradigm shift is when we talk about mobile first, it's not just about phones anymore. It could be your refrigerator I'm talking about, and those are things we need to accommodate."<sup>81</sup>

### Focus on user experience

User experience is critical to the effective deployment of mobile apps. Mobile apps are used differently from traditional computer applications — they are used while moving or standing (rather than sitting), often in areas with limited bandwidth or intermittent connectivity and sometimes in harsh environments. All of this requires careful attention to user experience and design. Involving citizens and front-line workers in the design process could provide valuable end-user insights and result in more effective applications.

Applications for citizens require particular attention to user needs. Factors such as ease of use, interface, appeal, and functionality will play key roles in determining an application's success. The approach should be to design apps that help users navigate key life events or large populations of regular users and are built around specific experiences.

For mobile workforce solutions, smooth implementation requires close attention to assessing and prioritizing user requirements, identifying potential challenges and their solutions, and estimating — and explaining — the benefits to be realized.

### Iterative design: Prototype, test, prototype again

For years, the “waterfall” development model dominated the world of software development. This process flowed steadily downward, from requirements to design to implementation to testing, and finally ending at maintenance. It worked well enough for a time, but it had a major drawback: Changes after the initial deployment often proved cost-prohibitive. Everything had to be accounted for in advance.

Ultimately, developers realized that this posed a critical limitation, simply because people rarely get a design right on the first try. To overcome this, developers shifted to a development model that allows for constant evolution through recurrent testing and evaluation, a process called *agile development*.

Agile development is about rapid delivery, regular adaptation, and unyielding attention to design and technical excellence. It explicitly *assumes* that we rarely get the design right the first time. If this is true of software development, it is doubly true for mobile apps, where users engage with technology in radically different ways than they do with desktop — or even laptop — computers.

For this reason, mobile government implementation should look more like “beta government”: rapid iteration and scaling to meet shifting needs and demands, through small prototypes and pilots, staged rollouts, and allowance for small failures in an attempt to avert larger failures later.

### Make mobile a source of security, not a threat

There has been a lot of talk about the security risks associated with the rapid growth of mobile computing. Naysayers point to the possibility of data leakage over unsecured Wi-Fi networks and privacy breaches because of prolific mobile malware. A U.S. Government Accountability Office report even notes that “the number of variants of malicious software aimed at mobile devices has reportedly risen from about 14,000 to 40,000 or about 185 percent in less than a year.”<sup>82</sup>

And yet mobile technologies do not need to be a one-sided threat. These devices can actually be harnessed as tools for security enhancement. Instead of being viewed as a potential source of vulnerability, a mobile device can act as a powerful security key with the ability to verify identity, transmit encrypted data, or enable access to a particular site or service.

The private sector has already capitalized on this trend. Most people who use mobile banking utilize their mobile device not only to access their money on the go, but to authenticate their request as well. Small community banks and large national institutions alike use their customers' mobile phones as pass keys. For instance, Bank of America's SafePass program provides an extra layer of protection to online banking by texting a six-digit, one-time-use code to the user's registered mobile device. This code is part of a two-layer authentication needed to access one's online account.<sup>83</sup>

It's easy to imagine governments using similar mobile authentication techniques to secure the delivery of personally identifiable or sensitive information — which could include selective service requests, governmental educational loan updates, or public health records, among many other applications. The proliferation of smartphones offers the opportunity to employ new validation methods such as voice recognition, geo-location identification, and even facial recognition scans from a phone's touchscreen.

### Define a governance structure

Agencies should have a clearly defined governance structure to design and implement mobile strategies. As with any new technology, different groups (agency leaders, government workers, citizens, central IT, etc.) will have different priorities. The appropriate governance structure can allow everyone to be heard and scarce resources to be allocated effectively.

Strong governance improves coordination within and among agencies. This is important in identifying areas where mobile apps make sense and avoiding the creation of multiple apps that serve a similar purpose. For example, [USA.gov](http://USA.gov) currently has two apps to help individuals quit smoking, two that track heat indices and provide tips for avoiding heat exhaustion, and four that evaluate air quality.

# Conclusion: Getting mobile right

Government agencies aren't the only organizations struggling to adapt to mobile technology. So are many companies. But if mobile is a challenge, it is also an opportunity: a chance for the public sector to start closing the productivity gap, reassess its business practices, boost its efficiency, and renegotiate its relationship with the public it serves.

Government can do plenty of small but important things with mobile technology, from improving service delivery to streamlining work flow. But if public agencies truly want to reap gains from their investment, they will need to use mobile technology to *redefine their approach to problem solving*. They will need to recognize that mobile tech is a game-changer, allowing them not just to redesign how they work internally, but also how they relate to the world around them.

Nike understood that mobile gave it the chance to be more than a shoe company — that by harnessing mobile it could partner with its customers to advance their athletic goals. Government may have different motivations and objectives, but it has a similar opportunity. The citizens it serves have myriad goals — whether it's getting to work on time or finding a route out of poverty — and mobile technology gives the public sector a virtually unprecedented capacity to understand, communicate, and partner with them. It's a chance that should not be squandered.





# Appendix

## 1. Mobile adoption and value generation

Calculations assume a 12 percent increase in productive time, which is derived from a Meritalk analysis that estimates 240 hours of additional work per mobile worker, assuming a 250 day year and an 8 hour work day on average. The government headcount (Federal, state, and local) is 19 million and we assume an adoption rate of 35 percent. Additional time contributions are converted into monetary terms using a \$36 per hour wage rate.

## 2. Productivity increase in caseworkers

Our analysis shows a 45 percent increase in caseworker productivity. This is derived from looking at time spent on administrative activities by caseworkers, now at 65 percent. The reduction in administrative time due to mobile adoption is 24 percent. Hence, administrative time for caseworkers could be slashed from 65 percent to 49.4 percent, leaving 50.6 percent of time for productive work. Thus productive work time would increase from 35 percent to 50 percent — a 45 percent increase in productive time.

## 3. Salary and pension savings estimates

Mobile adoption will increase the productivity of Federal employees by 12 percent (240 hours a year). Thus mobile adoption in the U.S. Federal government will double from 35 percent in 2011 to 70 percent in 2020, with a CAGR (compound annual growth rate) of 8.02 percent. Mobile adoption will be most effective in areas where there is direct interaction with customers and field work. There were 402,911 such Federal employees in 2011. The proportion of retirements in the above group will be similar to the retirements in Federal government overall. The Federal government will try to offset the gap through productivity increases such as mobile adoption.

With a 12 percent productivity increase, the Federal government will be able to add a value of \$694 million or 21.7 million hours by 2020. The Federal government would offset the number of retirements (avoid recruiting) by 10,851 personnel during this period due to additional productivity. The total lifetime savings from this offset would be \$25.9 billion, which includes a savings in salary of \$20.1 billion and pension savings of \$5.8 billion.

## 4. Mobile savings for law enforcement

The total number of law enforcement officers in the U.S. is 636,410. The time saved per officer due to mobile technology equals 0.5 hours per day. The total time saved for all officers would be 100.8 million hours per year [(A)\*(B)\*(approx. 317 working days)]. Assuming an average hourly wage for law enforcement officers at \$27, this would mean the value of total time saved equals \$2.72 billion per year [(C)\*(D)].

## 5. Combined salary and benefit savings for fieldworkers

The enhanced value from mobile and the rate of mobile adoption was adapted from Meritalk's "Mobile Powered Government" analysis—approximately a 12 percent boost in productivity. We look at only those Federal workers with regular face-to-face contact with citizens, a population we estimate at 402,911 individuals. The Total New Hire Equivalents (NHE) is calculated by applying productivity savings over a decade; 10,851 NHEs. Lifetime salary and pension savings were based on average lifetime tenure for Federal employees (29 years), average pension duration (16 years), average Federal employee salary (\$32/hr) and average annual Federal pension cost (\$32,824). Total combined lifetime savings then amount to \$25.9 billion.

## 6. 311 mobile time savings for citizens

In New York City, the number of 311 telephone calls per year equals 20 million.

Citizen time spent on average call (duration + wait time) equals 245 seconds. Total citizen time spent on 311 calls per year equals 1.36 million hours.

### Assuming half the complaints (i.e. 10 million) shift to smartphones:

#### Smartphone Route

- Number of 311 complaints per year via smartphone = 10 million
- If we assume citizen time spent on average complaint = 60 seconds
- Total citizen time spent on 311 complaints per year = 166,667 hours

#### Phone

- Number of 311 phone calls per year = 10 million
- Citizen time spent on average call (duration + wait time) = 245 seconds
- Total citizen time spent on 311 calls per year = 680,556 hours
- (A) Total citizen time spent on 311 complaints (smartphone route + telephone) per year = 847,222 hours

#### Savings

Citizen time saved = 513,889 hours [(A) – (B)]

Given a mean hourly wage for all occupations of \$22, the value of citizen time saved can be estimated as \$11.3 million.



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