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Spring-Summer 2017

About @gov

@gov is a digital magazine designed to deliver forward-thinking and practical insights to government professionals as they face increasing demands and emerging social needs in a rapidly changing world.

Offering insights spanning issues that affect both national and local governments, *@gov* looks at the most pressing topics faced by government and public sector organizations.

This digest contains a sample of the content you will find on kpmg.com/atgov.

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From the editor

In January, the *@gov* editorial team assembled to discuss the issues raised by leading sector clients throughout 2016, and to share our perspectives for the year ahead. Perhaps unsurprisingly, given the volume of discussion data and analytics (D&A) continues to attract across private and public sectors — the subject looks set to dominate government agendas in 2017.

The role of data is more significant than ever in public sector strategy, and is increasingly helping government to meet the demands of citizens as to how, when and where they access services. As governments seek to gain a more complete data picture to deliver more responsive services, and keep up with the relentless pace of private sector innovation, the issue of trust between government and citizen plays a more important role than ever before.

Under the theme of 'data-driven government', the second edition of *@gov* focuses less on system integration tools, and more on the role of D&A in helping bring tangible solutions to service delivery challenges.

While several successful D&A initiatives by various departments and agencies are profiled — from smart transit apps to predictive analytics programs to forecast future service demand — we also provide an account of the challenges still facing many government agencies, with practical next steps based on experience with a range of government and private sector clients.

The topics selected can help move governments forward in their data journey, regardless of where they are today, starting with establishing the right governance and putting the right executive leadership in place (page 6), to overcoming public fears that surround data-sharing (page 8), to more advanced, future-looking applications like predictive analytics (page 18) and intelligent automation (page 24).

I hope this latest edition of *@gov* proves to be informative, thought-provoking and forward-looking.

As ever, if there are topics you'd like addressed, or if you have any comments or questions about anything you read here, please feel free to contact us at government@kpmg.com.

Nick Chism
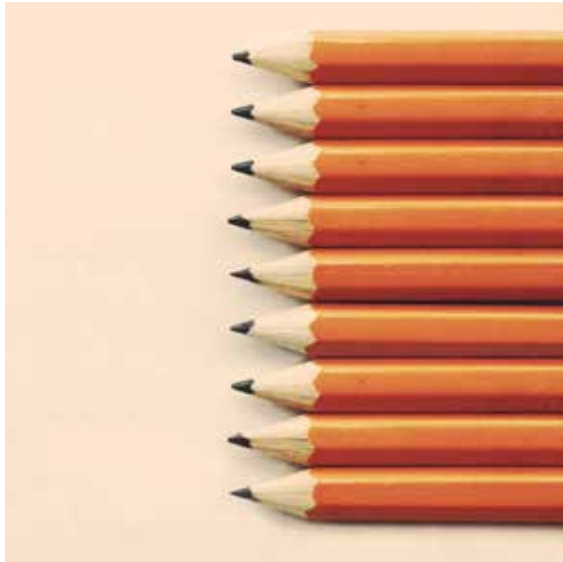Global Chair, Infrastructure, Government & Healthcare Deputy Head of Global Sales & Markets, KPMG International

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Big data boom

drives need for new Chief Data Officer role

Viral Chawda, Managing Director, Data & Analytics Center of Excellence, KPMG in the US

As governments at all levels recognize how data and analytics (D&A) can help improve their services and outcomes, many are recruiting chief data officers (CDOs) to help build data science capabilities. However, these newly-hired executives are wise to take careful, initial steps to overcome typical policy, organizational, cultural and technical barriers to help their agencies gain full value from the vast data at their disposal.

Introducing the chief data officer role

By 2019, it is estimated that 90 percent of global organizations will have hired a CDO.[1] While the CDO title is relatively new in the government and commercial realms, many organizations have found it invaluable to have executive-level oversight of their D&A activities.

This c-suite leader can serve as a D&A champion, while promoting data sharing among groups, setting data policies to create standardization of data assets and establishing enterprise data governance. They often also lead enterprise data strategies, develop 'data as a service' to department 'clients', and coordinate cross-agency analytics initiatives.

If the CDO's job scope sounds broad, the challenge is compounded by the fact that governments often have multiple, distributed data silos and, frequently, antiquated data management infrastructures that impact data quality. In addition, the absence of data governance structures, or an internal culture of data sharing, can make the CDO task large and time-consuming.

Best first steps for government CDOs

In light of the diverse challenges CDOs face, they must find ways to effectively meet the needs of their agencies' clients and make the most powerful impact with the available resources.

Based on industry-leading practices, and experience from successful D&A engagements, here are my prudent initial steps for a CDO to head a successful program:

1. **Create, validate and communicate a vision:** To help focus all efforts to benefit the enterprise, a CDO's first fundamental step is to create a written vision statement that aligns D&A activities with executive and legislative objectives. They need to validate this vision with their executive and then communicate it to other leaders to achieve awareness and buy-in.

2. **Form a working group to develop the D&A strategy:** The CDO should form a working group with representatives from different agencies and departments who can help plan and shape the D&A strategy. It's vital to recruit members who are passionate about D&A and the new vision. Ideally, delegates should also have the authority to make decisions. CDOs should consult with the CIO or other established technology leaders to find such candidates.

3. **Construct initial inventory of data assets:** Before developing the D&A strategy, the CDO should identify, at least at a high level, the data assets in place, under development and planned for development. While data assets naturally include the available 'data' and processes, they also include 'organizational components' like data governance and management, and corresponding skill sets, and 'technology' aspects relating to the current infrastructure. This inventory should also cover 'analytics' and take into account the techniques currently being used to extract value from data.

4. **Gather and understand existing D&A initiatives:** It's important for the CDO to identify and understand ongoing or planned D&A initiatives, particularly if separate agencies are conducting independent programs in which synergies could be achieved.

5. **Prioritize opportunities to exploit D&A assets:** With all the above information gathered, the CDO's working group can prioritize candidate D&A improvement projects. Among the key criteria are programs that align with executive and legislative objectives that will clearly and quickly demonstrate value and that will offer sustainable results. Sustainability will likely hinge on whether the necessary infrastructure is in place and if the D&A project will offer early, demonstrable results. The plan must therefore contribute to building the right, long-term data infrastructure but also prove early value.

6. **Select and execute a pilot project:** The final step in this process is to execute a well-designed pilot to highlight the benefits of D&A, prompt buy-in from agency officials and provide helpful lessons to ease later program expansion.

Developing a flexible, effective D&A strategy

While the sequence or prioritization of the planning steps a CDO should take will naturally vary depending on an organization's specific needs and priorities, they form invaluable building blocks to help the D&A leader chart a solid strategy.

One caveat is that in government, objectives and priorities can shift suddenly, along with budgets, changes in administration or mandates. So, CDOs must be prepared to revisit, reevaluate and revise their D&A initiatives accordingly.

Despite the challenges of building a data culture in government, the potential applications of D&A are endless. Under the leadership of a capable CDO, governments can break down silos to better share information, develop standards and best practices, and effectively tap into data assets to achieve better outcomes for their citizens.

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(vchawda@kpmg.com) Viral has more than 19 years' experience in helping organizations create value from their data assets. His D&A experience spans multiple industries, including government, involving the delivery of complex programs using advanced analytics and visualization techniques.

KPMG's network of D&A professionals recognizes that analytics has the power to create great value. That is why we take a business-first perspective, helping solve complex challenges using analytics that clients can trust. Dedicated public sector D&A professionals focus on solving complex issues unique to government across all the key drivers of organizational value, including risk and performance.

[1] The Rise of the Chief Data Officer Signals an Age of Infinite Possibilities. (16 December 2016). Retrieved 6 January 2017, from http://www.gartner.com/newsroom/id/3546517.

Informed consent:

How government can unlock value from data

Iain Gravestock
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Governments have the opportunity to make a more transparent and persuasive case for data sharing to deliver more personalized services to citizens.

Many governments are looking to gain a more complete picture of their citizens as they try to better respond to the public's changing needs. The public sector faces a number of challenges in persuading citizens to share more personal data, and a recent series of Twitter polls conducted by KPMG's Global Government and Public Sector practice suggest that trust among citizens around data sharing remains low.[1]

To succeed in winning over a skeptical public, focus should shift towards transparency, an essential foundation for building trust, and articulating the benefit of using data to add value to people's lives.

Private sector articulates value better

Citizens now voluntarily share more information with the private sector than government. Think of everything we share on social media, and with online shopping platforms. But why? Because the private sector is better at articulating its value proposition, and once it gets your data, it retains, arranges and shares it efficiently within its organizations to personalize its product or service offerings. If done well, customer loyalty and revenues surge. One example is Amazon's personalized recommendations engine that now makes up 35 percent of its total product sales.[2]

Government, on the other hand, has struggled to shake the image of monopolistic provider, offering citizens limited control over the personal information it holds, and providing fewer personalized services in return. Often, with different branches of government asking for the same details time and time again.

A general distrust affects confidence in data handling

Citizens in several jurisdictions have expressed a growing distrust[3] of government and politics in general. This doesn't bode well for governments looking to persuade their citizens to part with more personal information.

This is especially true in individualistic societies, such as the UK and the US, where the public continues to express a desire for greater 'control' in their interactions with government.

A growing number of governments are experimenting with the concept of 'control' by putting privacy and information sharing into the hands of the people in the form of user consent. The emergence of mobile apps offers the opportunity to test consent-based models that allow governments to work with citizens to share their information with third-party providers, trusted parties and loved ones — both Howz[4] and Evergreen Life[5] are good examples of apps that help advance the power of consent in real time when it comes to sharing personal information, such as health records.

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[1] KPMG's Global Government & Public Sector network conducted a series of seven polls on Twitter relating to public trust and government use of data between October 2016 and February 2017. The polls received a cumulative 107,924 votes, with an average engagement rate of 5.4 percent.

[2] The Power of Personalized Product Recommendations. (9 March 2017). Retrieved 13 March 2017, from http://www.intelliverse.com/blog/the-power-of-personalized-product-recommendations.

[3] Trust in Government. (n.d.). Retrieved March and April, 2017, from http://www.oecd.org/gov/trust-in-government.htm.

[4] https://www.howz.com/.

[5] https://evergreen-life.co.uk/our-product/.

Check out our Twitter poll infographic on page 31

Data risk to data value

In the UK, government has tended to focus on the security and protection of data sets, rather than on communicating proactively about the potential of greater information sharing. For good reason, security and protection are critical prerequisites, as realized in the Child Benefits recipient's loss in 2007.[6] As well, the lack of popular support and privacy concerns have historically undermined high-profile programs, like National Identity Cards[7] in 2011 and more recently Care.Data.[8] Both contributed to public nervousness about the use of personal data but highlighted the need for government to communicate their intentions clearly to citizens with regards to data, in addition to the potential benefits.

In Europe, the General Data Protection Regulation (GDPR)[9] is redrawing the boundaries of government responsibilities and relationships relating to citizen privacy and control, increasingly focusing on the transparency, auditability, and granular consent from citizens themselves for sharing data. Despite Brexit, the UK also intends to implement the GDPR in May 2018.

The UK National Data Guardian (NDG) is another good example of a government organization focused on creating a more informed public on the use of their data and the benefits of sharing. Understandability, granularity and timeliness of consent are key themes throughout a recent report.[10]

Actions government can take to ease data sharing

1. Adopt greater transparency and communication

Governments have seldom seen the need to publicize the results of their dealings with citizens' data.

Traditional consultations and methods of communicating with the public about data are not dynamic and inclusive enough. More and more it is about using newer channels, in addition to traditional ones, to reach the broadest set of stakeholders as rapidly as possible.

2. Communicate best practice and success stories

Even when data is used creatively and appropriately, the benefits are not always there for people to see. Publicizing the success and long-term benefits of data best practices would help make a more robust case to the public for sharing more personal information. The largely untapped body of best practice cases could be used to showcase the long-term benefits of data sharing, while building a stronger case for more permissive public attitudes.

3. Link existing data to provide a clear, higher-value service offering

Governments, for the most part, remain siloed and one of the greatest challenges in the public sector's handling of data remains the lack of data linking. Linked data is in its early days in the UK, but the opportunities to measurably improve the personalization and efficiency of services is clear.

We also need to be thinking about the impact of consent and opt-out based models now or we may not be able to achieve the value we need from more joined-up and inclusive information sharing.

What does success look like?

In the end, to gain greater license to use more information about its citizens, government can become more actively transparent in its dealings with personal data, and make proactive strides towards communicating its value more clearly in ways its citizens will understand. Balancing consent and trust with

efficiency of service delivery certainly remains a huge challenge.

Success would mean a majority of the public would not only consent to sharing more of their personal information but understand the value in doing so, and would be motivated to update their information on a voluntary basis. With this support, governments could embrace more ambitious data initiatives leading to better, and more citizen-centered services without the fear of disruption or the loss of goodwill.

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[6] UK's families put on fraud alert. (20 November 2007). Retrieved 13 March 2017, from http://news.bbc.co.uk/2/hi/7103566.stm.

[7] Identity cards and new Identity and Passport Service suppliers. (26 March 2013). Retrieved 13 May 2017, from https://www.gov.uk/guidance/identity-cards-and-new-identity-and-passport-service-suppliers.

[8] Boseley, S. (6 July 2016). NHS to scrap single database of patients' medical details. Retrieved 13 March 2017, from https://www.theguardian.com/technology/2016/jul/06/nhs-to-scrap-single-database-of-patients-medical-details.

[9] (Regulation (EU) 2016/679.

[10] https://www.gov.uk/government/publications/review-of-data-security-consent-and-opt-outs.

Internet of Things drives operational gains for Indian public transit

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As cities around the world attempt to tame traffic gridlock and invest heavily in public transport systems, they often struggle to operate their new transit networks cost-efficiently and deliver a passenger experience that will satisfy demanding commuters.

A just-launched program in one of India's sprawling urban areas is now proving the potential of intelligent transport management systems powered by Internet of Things (IoT) — connected devices onboard city buses — to transform the way cities manage their transit challenges.

This is the case in Thane, India, a growing metropolis adjoining Mumbai, where KPMG in India is supporting the Thane Municipal Corporation in developing its own smart public transport platform.

Transforming public transport with IoT devices

The City of Thane faced mounting pressures as its 470-vehicle public transit fleet operated around the clock to meet the demands of 1.8 million residents. Routinely stranded in grid-locked road conditions, the overworked buses suffered unexpected break-downs, leaving commuters waiting at transit stops wondering if and when their bus would arrive.

City officials recognized the potential to improve bus performance and passenger satisfaction. By equipping Thane's buses with GPS-based tracking devices — connected by the IoT on an open data channel to a command center web application — transit officials would be able to track the buses in real time to alert commuters to schedule and route changes. In addition, the city would be able to monitor vehicle health, to schedule maintenance before break-downs occurred, and gain extensive analytics reports on fleet efficiency.

Collaboration to calm commuter chaos

Once Thane officials put the wheels in motion for the intelligent transport management system, the first of its kind in India that includes preemptive maintenance features, they selected KPMG in India to design the solution, including architecture for the necessary data algorithms, selection of technology partners and oversight of system roll-out.

Thane wanted a bigger, holistic view of how the technology could transform their operations. They came to understand how the whole science would work, and how data from the connected devices would create predictive ability for future challenges. This spirit of innovation complemented Thane's involvement in India's Smart Cities Mission, a government initiative to invest in urban technologies to drive economic growth and improve citizens' quality of life.

A team of data scientists from other projects, and experts from Indian academic and state institutions, including external contacts made through work on other Smart Cities programs came together to design an algorithm that could make sense of the unpredictable travel data coming from buses.

They also worked alongside transit maintenance crews to draft precise plans to install the GPS tracking devices without taking buses out of service or disrupting schedules. This often meant assigning technicians to board buses between stops and install the devices while vehicles traveled with passengers onboard.

Smart Cities eye intelligent transport management

As the city continues to install devices on its buses in phases, to amass greater data volumes in the new command center, the system has shown its early potential to provide in-depth reporting and analysis, accurate passenger schedule alerts and more efficient fleet maintenance planning.

The city is considering ways to sustain project momentum, such as leveraging the system to enable location-relevant advertising to bus passengers, to create ongoing revenue for transit improvements. Also, as many Indian cities confront their urban transport challenges, the city and KPMG could jointly advise others on strategies to introduce intelligent transport management systems as part of their Smart Cities agendas.

While word is spreading about the Thane project, it's extremely gratifying to introduce new ideas and technologies to help deliver innovative public services that will greatly benefit Indian society and the economy.

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The data-trust deficit

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Recent polls conducted by KPMG reveal a desire among citizens for more online services from government, but a reluctance to share personal information electronically.

As governments work to improve and modernize service quality and delivery, the need to access more personal information has increased. This has coincided with the finding that while a majority of citizens feel government should be doing more to move services online more quickly, they remain uncomfortable with sharing personal information with the public sector.

KPMG Twitter polls

A recent series of online Twitter polls[1] conducted by KPMG's Global Government and Public Sector network, targeting government stakeholders in the US, the UK, Canada, Germany, Australia and India, explored public attitudes to sharing personal information with government online, the digitizing of services and trust in public sector data security. The results show a conflicted response from citizens accustomed to the conveniences of the digital age — provided predominantly by private companies — but skeptical of government's ability to keep information safe.

The polls revealed key insights for government, and identified an opportunity to address the deficit in public trust that currently surrounds online information sharing. It seems that, while work remains to persuade citizens that sharing personal information online is not only safe but beneficial, government can make a clearer articulation of the 'pay-off' for citizens.

Desire for convenience

Innovation in customer service technology in the private sector has left citizens expecting more from every provider, including government. In fact, the KPMG Twitter polls show that a majority of respondents feel the biggest opportunities for the public sector in D&A lie in elevating customer service.

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[1] KPMG's Global Government & Public Sector network conducted a series of seven polls on Twitter relating to public trust and government use of data between October 2016 and February 2017. The polls received a cumulative 107,924 votes and targeted users in the US, the UK, Canada, Australia, Germany and India with interest in government and civic affairs. Votes are casted anonymously.

Forty-one percent of respondents regard governments as "still too cautious," with a further 39 percent saying governments "are not doing enough" to follow the private sector's lead. Simply put, citizens today now expect the convenience, speed and personalization they get from private companies.

A lack of trust

Why are citizens nervous about government use of data? An OECD report points to declining trust in national governments across a range of its member countries; a downturn attributed partly to nervousness about the way governments are using their personal information.[2]

The poll seems to confirm that this general mistrust extends to government's ability to maintain information security (of course, repeated, high-profile security breaches also don't help[3]). Thirty-seven percent of respondents answered they believe information security to be the "biggest challenge" faced by the public sector in collecting and using data.

> **"They [the government] have had too many breaches due to poor practices, to trust with more info."**
>
> —*Twitter user, responding to the question: "What do you think the biggest challenge the public sector faces in collecting and using data?"*

[2] OECD (2017), Trust and Public Policy: How Better Governance Can Help Rebuild Public Trust, OECD Public Governance REviews, OECD Publishing, Paris. http://dx/doi.org/10.1787/9789264268920-en.

[3] Association, P. (13 September 2016). Government breached personal data security 9,000 times in a year, watchdog reveals. Retrieved 31 March 2017, from https://www.theguardian.com/uk-news/2016/sep/14/government-breached-personal-data-security-9000-times-in-a-year-nao-watchdog-reveals.

The polls also found that 67 percent of respondents think online personalization "sounds creepy," and that a further 48 percent would prefer not to interact with virtual agents when accessing government services. In the private sector, consumers are becoming accustomed to dealing with virtual agents or 'chatbots',[4] and provided they deliver good service, are satisfied. So, why not trust automated services from the public sector? There are a number of potential reasons, including a latent bias, born of the distrust mentioned above, or maybe a previous bad experience.

In addressing these attitudes, government can communicate best practice and success stories more strategically, emphasizing the value proposition put forward by data sharing, and to reassure citizens that security breaches remain the exception.

Greater transparency required

The large percentage of respondents who clicked 'unsure' or 'hard to say' suggests many citizens feel they don't have enough information to make a decision about what governments are doing with data.

An opportunity therefore exists for governments to pursue an agenda of transparency, helping citizens understand how the public sector is using their information. Facebook, for example, has grown to embody many attributes KPMG has deemed key to digital trust — reliability, credibility, transparency, integrity and security,[5] and the organization remains in constant communication with its users regarding data security and use of personal data.

Communicating value

The final poll in the series asked respondents whether they would be open to sharing more data with government if it would lead to better services, to which a large majority

replied 'no' (52 percent of those polled, versus 28 percent 'yes').

> ## "The reason I said no is because how would you know that it would lead to better services?"
>
> —*Twitter user, responding to the question: "Would you be open to sharing more data with government if you felt it would lead to better services?"*

But what about the millions of people who sign in to other websites daily, readily exchanging personal information for access to content, services and convenience? Do they just trust the private sector more? Interestingly, most simply don't read the terms and conditions,[6] perhaps because the perceived value proposed by private companies simply outweighs the desire for a full understanding of the agreements they enter into. For governments, the trade-off is more complex, and currently, the services or content offered in exchange for the public's personal information are perceived (rightly or wrongly) as less immediately 'valuable'.

> ## "Strangely, people share scads of information with Facebook and Twitter"
>
> —*Twitter user, answering fellow respondent's skepticism to the question: "Would you be open to sharing more data if you felt it would lead to better services?"*

Government has the opportunity to make up ground in reassuring constituents their data is safe, and overcoming this fear will likely become a top priority for the immediate future. Citizens need to be convinced of the pay-off from data sharing with a clear and renewed articulation of its value proposition. And, conversely, citizens must approach the table with more of an open mind.

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Leah Fegan (lfegan@kpmg.ca) Leah has over 10 years' of experience helping organizations achieve their strategic marketing objectives across domestic and international markets. Key areas of expertise include integrated marketing communications strategy, campaign management, and digital and social media.

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[4] Noto, G. (5 December 2016). Customers Don't Prefer Chatbots Over Humans Yet-But They Will, Says Survey. Retrieved 31 March 2017, from http://bankinnovation.net/2016/12/customers-dont-prefer-chatbots-over-humans-yet-but-they-will-says-survey/.
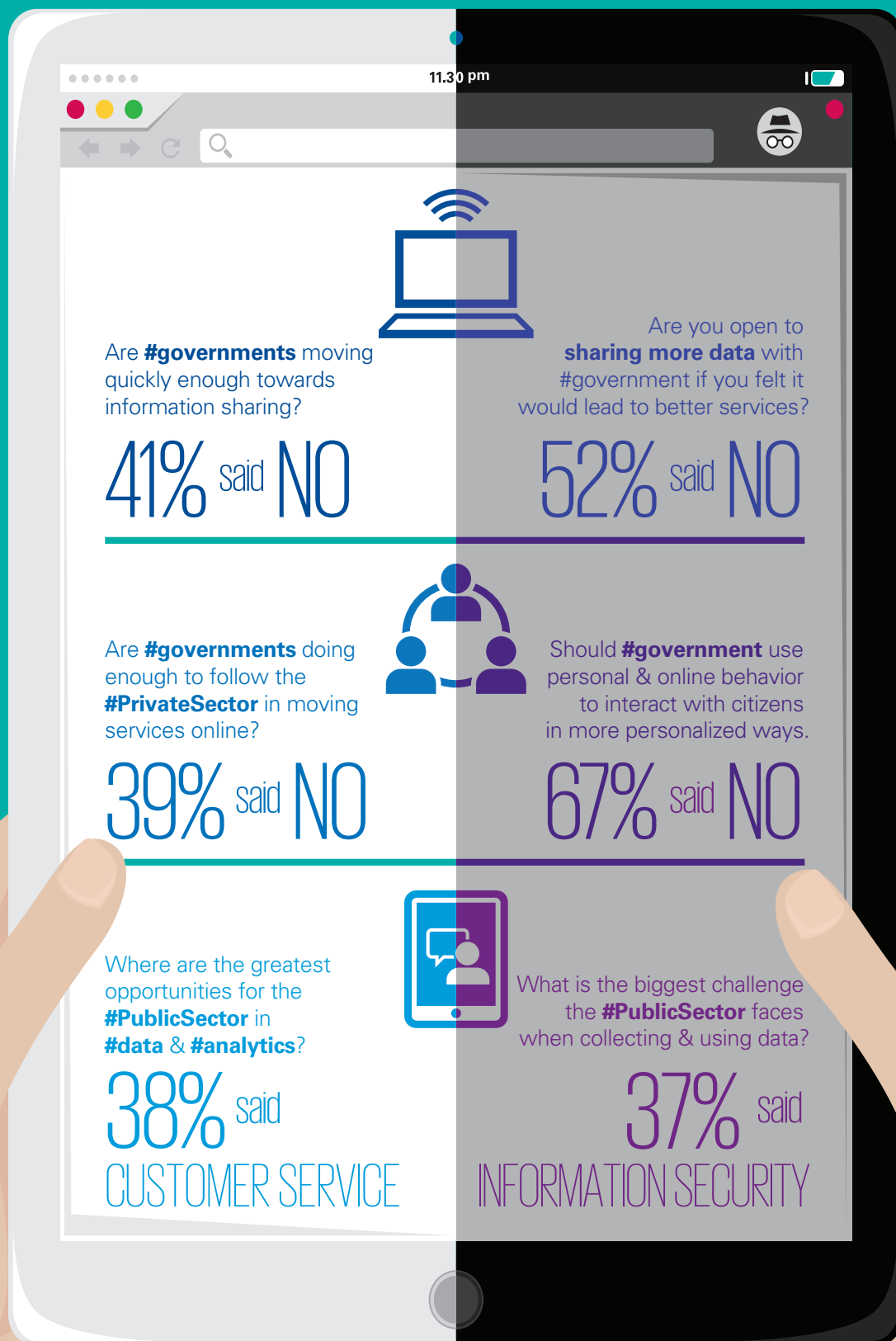
[5] Rast, C. (28 October 2016). Building trust in D&A. Retrieved 31 March 2017, from https://home.kpmg.com/xx/en/home/insights/2016/10/building-trust-in-analytics.html.

[6] Berreby, D. (3 March 2017). Click to agree with what? No one reads terms of service, studies confirm. Retrieved 31 March 2017, from https://www.theguardian.com/technology/2017/mar/03/terms-of-service-online-contracts-fine-print.

Convenience vs. trust

KPMG 's Global Government & Public Sector's Twitter poll results tell the story of a conflicted public accustomed to the conveniences of the digital age, but who lack trust in government to handle their private information appropriately. However, results point to opportunities for governments to better position and communicate modernization initiatives.

Are **#governments** moving quickly enough towards information sharing?

41% said NO

Are you open to **sharing more data** with #government if you felt it would lead to better services?

52% said NO

Are **#governments** doing enough to follow the **#PrivateSector** in moving services online?

39% said NO

Should **#government** use personal & online behavior to interact with citizens in more personalized ways.

67% said NO

Where are the greatest opportunities for the **#PublicSector** in **#data** & **#analytics**?

38% said CUSTOMER SERVICE

What is the biggest challenge the **#PublicSector** faces when collecting & using data?

37% said INFORMATION SECURITY

11.30 pm

Breaking up transport bottlenecks with D&A

Ben Foulser, Associate Director, Transport Advisory Practice, KPMG in the UK

As public transport operators struggle to match roadway and transit network capacity with rising demand, ground-breaking data and analytics (D&A) techniques — powered by real-time traveler information — can help ease the ever-growing congestion.

Congestion breeds more congestion

With transport volumes multiplying on roads and public transport systems, this congestion frustrates customers, increases the wear and tear on assets and slows the network. And the problem only compounds, as uneven traffic flows at peak times lead to over-usage on main routes and overcrowding on transit vehicles, causing more delays. In other words, congestion creates more congestion.

While advances in traveler communications — like trip planning websites, motorist satellite navigation (satnav) tools, email notifications and commuter apps — can alert people to hold-ups and suggest alternate routes, these messages may simply divert everyone in the same direction, creating new problems. At the same time, transport authorities may watch in frustration as some elements of the network are overcrowded, while others have spare capacity.

Using transport network data to 'steer' commuter behavior

There are excellent examples of how transport authorities are making focused investments in technology to relieve heavily-overstretched infrastructure, improve journey times, travelers' experiences and investment.

For example, transport authorities in Greater London are taking action in response to data that revealed the number of passenger journeys on Transport for London (TfL) services increased by half a billion in just 5 years.[1] As they considered the situation, they recognized that they possessed vast data, which could feed into sophisticated capacity and demand models, as well as

the potential connectivity to get the right messages out there.

London's TfL is now evaluating the best approaches to leverage its many established databases, like the Oyster transit-user card, transit system contactless payment systems and the Congestion Charge driver toll system. By doing so, they could access powerful assets, namely behavioral details for many travelers, to gain an understanding of their typical travel patterns.[2]

TfL is beginning its own journey to invest in tools to analyze the data and tailor customer communications. For example, by collecting data about its customers, through their individual accounts and through multiple engagement channels, transport operators could segment those travelers experiencing congestion or delays and then suggest different ways to reach their destinations, and

[1] Transport for London | Every Journey Matters. (n.d.). Record passenger numbers on London's transport network. Retrieved 20 December 2016, from https://tfl.gov.uk/info-for/media/press-releases/2015/june/record-passenger-numbers-on-london-s-transport-network.

[2] Everitt, V. (13 October 2015). Leveraging Our Data for Maximum Impact (UK, Transport for London, Safety, Accessibility and Sustainability Panel). Retrieved Jan. & Feb., 2017, from http://content.tfl.gov.uk/sasp-20151015-part-1-item12-leveraging-our-data-for-maximum-impact.pdf.

make best use of available capacity. Using emails, SMS and apps, operators could even offer passengers incentives to take a particular route, travel at a specific time, or use a certain mode. And with real-time data on recipients' behavior, operators can quickly adjust their messages to focus on the most effective incentives.

TfL is also investigating the use of mobile phone network data to track increases in road traffic in real time.[3] This, along with the growth in 'connected cars,' which transmit data on their movements and satnav destination, will soon provide transport managers with enhanced tools to predict and immediately respond to the formation of traffic jams. They can then amend traffic light timing to ease congestion or even coordinate route directions among in-car navigation providers.

Mobility as a Service requires deeper commuter data

The need for richer data will also grow as transport planners explore the concept of Mobility as a Service (MaaS), by which traveler needs could shift from private ownership of vehicles to consumption of transportation as a service, through a mix of public and private transport modes that enable them to travel according to their time, comfort and cost preferences.

Knowing the purpose of a customer journey would make it easier to manage demand optimally and equitably, but it is a highly challenging issue. Short of asking all travelers to register normal journeys and modal shift preferences, there is a need for more granular but non-invasive mechanisms to determine journey purpose and respond with tailored options to deliver MaaS.

The ultimate solution would result in strategic management of demand across public and private transport. Then, for example, city-bound drivers heading down the highway towards a major traffic incident could be told how much time they'd save by stopping at the nearest commuter park and ride and taking a train or bus.

Ultimately, this combination of data, analytics and personalized messages could strengthen the ability to use infrastructure at close to its optimum load, taking full advantage of the system's capacity, but avoiding the need for investments that only pay off at the busiest times.

Gaining public trust is critical

As public authorities develop these systems, they will encounter hurdles around the technology, the data-gathering, the analytics techniques and the communications systems.

The biggest challenges are likely to lie in persuading and organizing people. For example, travelers will only listen to messages if they trust the source, if they're confident that the organization's use of their personal data is both ethical and transparent, and that altering their route will produce the promised benefits. This requires good coordination among transport infrastructure managers and operators to manage the flows of data around the system.

If these systems are developed in the right way, travelers can route around congestion, and reduce the amount of congestion in the first place. This can provide citizens with better transport services and enable transport managers and infrastructure investors to maximize the capacity of our hard-pressed transport networks.

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KPMG's Global Public Sector Transport network works with public transport authorities to embrace emerging technologies to help increase capacity, optimize asset lifecycle, leverage existing data and improve customer experience.

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[3] Surface Intelligent Transport System. (24 September 2015). Retrieved 20 December 2016, from http://content.tfl.gov.uk/board-20150924-part-1-item07-surface-intelligent-transport-system.pdf.

Using predictive analytics in the service of vulnerable citizens

Paul Henderson, Director of Health Data & Analytics, KPMG in the UK
Eric Applewhite, Director, Public Sector, Technology & Transformation, KPMG in the UK

T he process mines historical and current data and then uses modeling in order to predict future events. For example, an analytical model can draw on past events and behavior patterns to predict the probability that child support payments will be honored in specific cases. Cases can then be scored to allow child support workers to determine their work priorities.[1]

In other words, predictive analytics facilitates data-driven decision making. Most governments already have information they could use to identify people in need of assistance. It's what they do with the data that is changing.

The potential of predictive analytics is coming to the fore in the way that governments deliver human services. Greater interagency coordination of services such as housing, mental health, child protection and addiction treatment becomes possible, bringing with it new insights and opportunities for innovation.

The benefits for citizens

In the human and social services field, predictive modeling is highly effective in assessing various risks by scoring their probability. With that information, investigators can focus valuable resources where adverse events are most likely to occur.

Protecting children

Research linking birth data to later risk of maltreatment has been influential in improving child protection practice. Researchers at the Center for Social Services Research at the University of California at Berkeley, for example, released a study in 2011 that tracked over 2 million children. They were able to identify specific factors at birth that were linked to higher rates of reported or substantiated abuse by the time a child reached age five.[2]

Similarly, the California Child Welfare Indicators Project (CCWIP) provides an open-source database of customizable information on the state's entire child welfare system. Data can be filtered by year, county, age, ethnicity, gender and placement type, among other categories. Child welfare agencies are thus increasingly able to identify in real time the children most at risk from being harmed — and to target their interventions accordingly.

New Zealand is launching a predictive tool focused on those who need services, rather than those who provide them.[3] SmartStart gives parents a customized timeline based on their personal profile. It provides tailored information about early childhood services, and establishes a newborn's future digital relationship with government. The service can also be used by professionals working with expectant mothers or new parents, but it's the parents who control which agencies have access to their information.

Preventing homelessness

Big data and predictive analytics are also supporting efforts to combat homelessness. CAMBA, a non-profit agency in New York, offers a prime example.[4]

The agency takes an integrated approach to programs in education, youth development, family support, health, housing and legal services. In partnership with the City of New York, it has developed the innovative HOMEBASE program, which is premised on the concept that preventing homelessness is more effective — and less costly — than reversing it.

That means using data to identify those at relatively high risk of becoming homeless, and simultaneously to direct resources most efficiently. Among key risk factors are prior use of a shelter, moving more than four times within a 12-month period, being under age 28 or being a young single mother.

Proprietary software is used to map these factors and related data onto the widely available Google Maps interface, producing color-coded dots to show concentrations of people at the greatest risk for homelessness. Different colors represent factors such as a prior visit to housing court or to a shelter. Field workers can click on a dot to see family composition and other details, and then organize their caseload accordingly.

The benefits for service providers

Predictive analytics offers significant benefits to those who provide human services. Not least are vastly improved targeting of services and benefits — often resulting in greater job satisfaction for service providers — and significant savings to the public purse.

Preventing fraud

As an example, the United States Social Security Administration (SSA) has established a fraud prevention unit dedicated to building data analytics to help workers detect and avert scams. The approach involves applying analytics to determine common characteristics and meaningful patterns of fraud, based on data from past allegations and known cases of fraud. The predictive tools increase the ability of the SSA to identify suspicious patterns of activity in disability claims and to prevent fraudulent applications from being processed.[5]

[1] Dr Steven Golightly, Los Angeles County Child Support Services, Predictive Analytics: Los Angeles County CSSD (PDF 336 KB), presentation to Western Interstate Child Support Enforcement Council (WICSEC) 30th Annual Training Conference, 20–24 October 2013, Kansas City, MO.

[2] See E. Putnam-Hornstein and B Needell, "Predictors of child welfare contact between birth and age five: An examination of California's 2002 birth cohort" (PDF 236 KB), Children & Youth Services Review 33, no. 11 (2011): 2400–07.

[3] New Zealand, Department of Internal Affairs, "SmartStart: The best start for parents and babies".

[4] The discussion of CAMBA is based on information from Forbes Insight, Digitizing Human Services: Field notes and forecasts from the front lines of government's technological transformation (2015), 27.

[5] Kanowitz, S. (22 April 2014). Social Security to step up fraud detection with predictive analytics. Retrieved Sept. & Oct., 2016, from https://gcn.com/articles/2014/04/22/ssa-fraud-detection.aspx.

The **Los Angeles County Department of Public Social Services** used predictive models to combat **child care benefits fraud**. It mapped out a network of participants and providers in order to see a visual display of central nodes that revealed where participants were colluding in fraudulent activities.

Imperatives and challenges

Predictive analytics is an exciting field, but it is not without challenges and potential limitations. It is important to be aware that predictive models generate probabilities, not facts. The undoubted power of such analytical tools may encourage heightened responsiveness from service providers, when appropriately targeted responsiveness is the goal.

The sensitivity of the data to be harnessed can be an issue as well. Interagency cooperation is essential to overcome restrictions to data access that could hinder the successful application of analytics.

Similarly, the Massachusetts health and human services department, MassHealth, is using predictive modeling to combat Medicaid fraud. In the first 6 months after the system was launched in May 2013, investigators recovered US$2 million in improper payments and avoided paying hundreds of thousands of dollars in fraudulent claims.[6]

Predicting service demand

These types of tools can also help agencies to identify where their resources will be needed in the future. The Administration for Children's Services (ACS), for example, administers child welfare in New York City, but it had no method of developing a profile of the future foster care population or predicting the facilities and resources this population would need. With KPMG in the US, it built a predictive model to support forecasting, planning and budgeting.

The modeling approach not only accounted for events while an individual was within the child welfare program but also developed child demographic characteristics, and then evaluated the extent to which these events and demographics could determine the probability of a child staying within or leaving the program.

The model can be re-run with updated data to refresh forecasts for the number and types of services and facility places needed over any given period.[7] That means the ACS is better able to plan and budget and, therefore, to negotiate with vendors and facilities. In other words, improved service planning leads to improved service responsiveness and efficiency.

What comes first? Robust D&A requires cooperation among involved parties across departments and at every stage of the process. But recent research by KPMG has shown that organizations around the world still need to build trust in their D&A — 60 percent of them say they are not very confident in their D&A insights.[8] Decisions that are based on inaccurate predictions may quickly erode the confidence not only of frontline workers but also of the decision makers themselves.

Human services go mobile

By 2017, there will be an estimated **2.6 billion** smartphone users globally.[9] Governments are seizing the opportunity to develop new ways of interacting and delivering services to their most vulnerable citizens.

[6] Stephanie Kanowitz, "Social Security to step up fraud detection with predictive analytics", GCN magazine, 22 April 2014.

[7] Tsao, B. (2016). Predictive Analytics and the Future of Health and Human Services. Policy & Practice, 74(5). Retrieved 30 October 2016.

[8] KPMG International Cooperative, Building Trust in Analytics: Breaking the Cycle of Mistrust in D&A, 2016.

[9] Lunden, I. (2 June 2015). 6.1B Smartphone Users Globally By 2020, Overtaking Basic Fixed Phone Subscriptions. Retrieved 31 October 2016, from https://techcrunch.com/2015/06/02/6-1b-smartphone-users-globally-by-2020-overtaking-basic-fixed-phone-subscriptions/.

The four anchors of trusted analytics:

1. **Quality.** Are the data and analytical models good enough? How well do service agencies understand the role of quality in developing and managing tools, D&A?

2. **Effectiveness.** Do the analytics work as intended? Can agencies determine the accuracy and utility of the outputs?

3. **Integrity.** Does the use of D&A follow regulations and ethical principles?

4. **Resilience.** Are long-term operations optimized? How well are good governance and securtiy being managed throughout the analytics lifecycle?

Because predictive models are built on historical events (such as known fraud cases), they forecast accurately only when scoring new data that contains similar relationships to those in previous data. As patterns of behavior change, predictive models must be reprogrammed with examples of the new behavior, or else they quickly become outdated and can no longer make accurate predictions.

Building trust in analytics

Data collection, interpretation and sharing clearly stands or falls on the quality of the information gathered — and on determining the most appropriate response to the results. It's evident that a genuinely transformative use of predictive analytics depends on the people making data-driven decisions, but most individuals find the operation of algorithms and models too opaque to verify — "we don't know how they work" — and that complexity can create a trust gap.

KPMG International's report *Building Trust in Analytics: Breaking the Cycle of Mistrust in D&A*, defines four 'anchors of trust' (see box above) that must underpin the successful application of analytics: quality, effectiveness, integrity and resilience. To strengthen those anchors, decision makers must take a systematic approach to managing the D&A lifecycle: from data gathering, through analysis

and modeling, and ultimately to service delivery and performance measurement. Trusted, high-quality processes and timely, effective responses are key to using data in the service of the citizen.

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KPMG's Global Human & Social Services (HSS) network works with a broad range of government agencies, private sector participants, civil society stakeholders and citizen groups to help create more efficient and effective human and social services. Our mission is to help governments carry out their core responsibilities to provide for the essential human needs of all citizens, and to ensure their basic social security.

Governments
seize private sector data solutions to achieve the SDGs

Kate O'Flaherty, guest contributor
Kate Maloney, Senior Manager, Development & Exempt Organizations, KPMG in the US

Businesses are using the vast amounts of data available today to understand and target their customers but they're not the only ones who can benefit from doing this. If governments are able to analyze information in the same way, they can gain insights into how they are performing, while engaging more effectively with citizens.

One public body starting to take advantage of so-called big data analytics is the United Nations, in order to help meet the 17 sustainable development goals (SDGs).[1]

As part of this, nations such as Afghanistan are using satellite imagery to make population estimates. This gives policymakers a more frequent analysis of population change — which is critical for SDG implementation.

"The census is only taken every 10 years, so this helps governments be more reactive," says Serge Kapto, policy specialist, data for development, bureau of policy and program support at the United Nations Development Programme (UNDP). "Big data analytics gives you good estimates that can assist in education and health. It also helps to estimate migration, in combination with mobile phone records, by tracking where people are going."

Meanwhile, mobile applications are helping UN member states to harness data to meet the SDGs. In China, an app has been produced[2] as part of a partnership between the UNDP and internet company Baidu. Available in 22 cities, the app links end users of

electronic waste such as TVs or washing machines to relevant recycling companies.

Programs such as these are part of a push among governments to innovate and improve citizen engagement. Among its advantages, this type of approach allows citizens to hold governments to account, as well as enabling more evidence-based policy decisions. "Real time feedback allows governments to be more informed," Gaya Branderhorst, director at KPMG in the US says.

The big data challenge

But the ambitious SDG agenda poses policy and operational challenges. Among these is access to timely and accurate data, which is an essential part of monitoring the program's progress and informing policy choices across the 17 goals and 169 targets.

At the same time, because large amounts of data are attractive to hackers, cyber security must be taken into account. The UN is aware of this risk and is currently putting together a set of basic policies to help manage the area.

There is also a need for resources to procure these complex technologies. Those involved say this makes public-private partnerships the key to success.

"Governments cannot afford to invest trillions of dollars in this annually," says Kate Maloney, senior manager, IDAS Institute, KPMG in the US. "This is why it's important that the private sector puts forward resources to solve these problems. There are plenty of providers developing innovative solutions, but they come at a price."

This is especially true in developing countries, which will require assistance in areas such as training. Yet ironically, the data opportunity is even bigger in these nations, according to Kapto. "The potential to leapfrog is huge in developing countries. They often have universal mobile coverage and can tap into ways of doing data analytics at a lower cost."

The motivation by governments to use big data analytics is certainly there, but it is investment and skills within the private sector that will really make the

difference. Pilots are already taking place but these will need to reach greater scale to have a wide reaching impact.

"There is lots happening here at HQ and down at country level," Kapto says. "But we are only now putting in place the tools and partnerships to help us get there. The partnerships are key — there is no way a single stakeholder can do it on their own."

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Kate has 14+ years' of professional experience leading and providing effective business solutions for sustainable economic development for a range of public, private and non-profit organizations. Key thematic priorities of her work include the Sustainable Development Goals (SDGs); global infrastructure; inclusion and vulnerable populations; resilience, D&A for development; and women's economic empowerment.

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KPMG's International Development Assistance Services (IDAS) practice brings extensive cross-industry expertise to enhance the capacity of all actors in the development space — government, civil society and the private sector — to maximize their impact in emerging economies.

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[1] Sustainable development goals. (n.d.). Retrieved 14 December 2016, from http://www.un.org/sustainabledevelopment/sustainable-development-goals/.
[2] China: E-waste. (n.d.). Retrieved 14 December 2016, from http://www.asia-pacific.undp.org/content/rbap/en/home/ourwork/development-impact/innovation/projects/china-ewaste.html.

Intelligent automation:
The next frontier in government transformation

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Thomas W Matteo, Director, Management Consulting, KPMG in the US

While intelligent automation presents a significant opportunity to drive transformational efficiencies, governments must proactively address challenges in realizing its potential to offer better service and renewed job satisfaction for workers.

In seeking to drive efficiencies, government is seen to take a more cautious approach than the private sector. However, the availability of powerful and inexpensive processing power coupled with advances in artificial intelligence (AI), natural language processing and the exponential growth of data, has created an opportunity for governments to embrace intelligent automation.

Intelligent automation, defined as the automation of labor by leveraging digital technologies to supplement or automate the tasks undertaken by knowledge workers,[1] can be put to work both in evaluating the quality, regulation and consistency of service delivered to constituents and in tackling the challenges presented by continually shrinking budgets and a workforce in flux.

Sector demographics: A changing workforce

Public sector workforce demographics across countries like Australia, Canada, Germany, the UK and the US are undergoing significant change. A recent report from the US Government Accountability Office predicts that over 30 percent of US federal employees will be eligible to retire by 2016.[2] As

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[1] Snyder, L. H. (17 October 2016). Getting started with digital labor. Retrieved Oct. and Nov., 2016, from https://home.kpmg.com/xx/en/home/insights/2017/02/the-creative-cios-agenda-getting-started-with-digital-labor.html

[2] US Government Accountability Office, 'Key Issues', Strategic Human Capital Management, 2016.

large numbers of 'boomer' generation employees vacate their positions, the automation of manual roles currently performed by these workers can enable efficiencies and behavioral change to kick-start agency-wide transformations.

The historical reluctance of the public sector to move labor 'offshore' due to security and political concerns has also amplified the potential for intelligent automation. Government now has the opportunity to improve service levels to citizens, elevate job satisfaction for existing workers and inspire a new generation of young talent into public service.

Intelligent automation technology

Intelligent automation spans core technologies such as rules engines and workflow to AI and machine learning that can support cognitive reasoning. This technology is evolving at different rates, providing a spectrum of capabilities ranging from simple, repetitive task automation to machines or 'bots' that can learn and adapt.

We feel the potential for deploying automation in the public sector is significant. For example, automation can allow for greater agility in responding to regulatory change, greater consistency and increased access to data.

As cognitive technology improves, automation can provide improved structured insight, allowing public sector organizations to make quicker and more detailed assessments that can inform reactive strategies. These 'non-invasive' opportunities mean little or no change to existing agency architecture, allowing organizations to provide better auditing and a higher consistency of work, while maintaining 24/7 availability.

Automation in action

The benefits of automation are already being felt in the private sector, where its deployment is resulting in significant ROI, greater job satisfaction, and better customer service.[3] One example with

potential application in a public sector setting is the call center.

Call centers typically perform a high volume of low complexity repetitive tasks, with service agents navigating simple systems and applications while simultaneously taking customer calls. When customers make contact via email or messaging systems, agents then have to jump back and forth between systems. This can slow down service, create repetitive tasks and produce inaccuracies that can impact customer experience. Necessary post-call admin also has the potential to lower agent productivity.

When agents are freed from processing repetitive, manual tasks and can focus on developing customer-centric skills, they can help drive customer satisfaction and long-term growth, in addition to significantly improving service level agreements.

Governments remain in discovery mode

Nevertheless, the wide scale deployment of automation in the public sector presents complex policy challenges. In contrast to the private sector, where large investments are already being made, many government agencies remain in discovery mode as to the opportunities that lie in intelligent automation, not to mention the potential implications of its wide scale deployment.[4]

Rolling out automation across the public sector may result in the phasing out of some positions. However, it has the potential to help resolve the challenge of an aging workforce whose tasks must be handed over to a new generation. Governments must be proactive in commencing this process by beginning an open dialogue with employees, and offering to retrain or redeploy those affected through specially designed programs.

Our early observations indicate that implementation of intelligent

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[3] Avent, R. (9 October 2016). Welcome to a world without work | Ryan Avent. Retrieved Oct. & Nov., 2017, from https://www.theguardian.com/commentisfree/2016/oct/09/technological-revolution-sparks-social-unrest.
[4] Whitehouse.gov, Preparing for the Future of Artificial Intelligence, 3 May 2016.

automation is resulting in higher employee satisfaction, as workers are freed up to focus on the activities that directly impact service users. In certain government and public sector jurisdictions, agencies have already begun incorporating intelligent automation into their transformation strategies. KPMG in the US recently completed a project with a US healthcare agency, strategically deploying automation to elevate the efficiency and quality of its data collection and QA processes. As a result of proactive communication between the agency and its workforce, certain employees previously in data aggregation roles are now able to invest their energies on more mission-focused and consumer-facing roles in order to provide greater value to constituents.

Roadblocks to change

While automation in large-scale public sector transformation projects is already under way, potential roadblocks must be overcome. Organizational culture remains a significant concern standing in the way of the successful implementation of large-scale transformation projects.[5]

The tendency for employees to resist change can derail a move towards wide-scale deployment of intelligent automation. Inevitably, wider adoption by government and the public sector will create new roles while phasing out others. Agencies must move to formulate proactive strategies to communicate the change to their workforces and provide a clear path towards new roles, especially as public sector organizations can expect a longer dialogue.

Proactive change management is crucial

To be successful, change strategies should establish and reinforce the link between intelligent automation and continuing employee development, and the ability of new technology to enhance existing roles, while also creating new and engaging ones. Overall, they will reinforce the image of a newly 'mission-focused' agency, facilitated by intelligent automation, which can provide opportunities for employees to deliver tangible value to constituents from the front lines.

A long road ahead

The potential for intelligent automation to enable future government and public sector transformation projects is enormous. But the potential for sector-wide deployment of automation will likely not be fully unleashed until governments have completed the public consultations and research to properly understand the opportunities, potential value and concerns.

They will require a high degree of openness and transparency, regular communication and active listening.

The success of proactive change management programs — and the speed at which intelligent automation can be deployed and profited from — will depend on the support of senior leadership and a secure mandate for change from employees.

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KPMG's network of member firms has made strategic investments in intelligent automation allowing it to establish and expand its technology ecosystem with leading partners to help governments effectively manage the challenges they face in their organizations and workforce.

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[5] KPMG International, KPMG Global Transformation Study, June 2016.

Virtual agents:

The next efficiency measure for government?

Kate O'Flaherty, guest contributor
Michael Rochanakij, Director, Solution 49, KPMG in Australia

Lack of funding is a matter of fact for many local governments. It creates a need to be efficient, but at the same time councils are under pressure to provide the digital capabilities expected by today's citizens.

This is leading to the rise of the 'virtual' or 'cognitive' agent. These intelligent systems, based on artificial neural networks similar to the brain, are able to — in theory — mimic a human being.

They are being enabled by constantly improving computing power, which is giving experts the ability to 'train' systems to analyze large amounts of data to develop machine learning — or artificial intelligence (AI) — algorithms.

The resulting virtual agents have human-like sensory capabilities. They can understand language, read text and recognize human emotions, giving them vast potential to improve service delivery for local and national governments.

Cognitive systems are already emerging in the UK, where Enfield Council in London is using a virtual agent called Amelia,[1] based on US firm IPsoft's AI technology platform. The agent can help residents locate information and complete standard applications, simplifying some of the council's internal processes.

Eight municipal governments in Poland[2] are using cloud-based virtual agents to deliver information on government services to citizens. The virtual web chat program developed by InteliWISE provides information on a wide range of services from identity cards to company registration and utilities.

Central government bodies are also exploring the benefits of virtual agents. In Singapore, chatbot Joanne[3] at the Inland Revenue Authority is able to assist with tax-related queries. The agent, the first 'V-Person' to be deployed by Creative Virtual in Singapore, has been implemented through partnership with Virtuariod.

"Artificial neural network algorithms based on how the human brain works are behind some of the most exciting advances we have seen in cognitive computing," says Michael Rochanakij, Director, solution 49x management consulting at KPMG in Australia. "They can read text, understand voice and see and identify objects. They can also process and respond to deviations from normal patterns. You can train them to be used in various ways — and because they can continuously learn, they improve all the time."

Cognitive systems are developing rapidly, championed by software giants IBM, Apple, Google, Facebook and Microsoft. Among their advantages, they are able to detect tone of voice, so they can tell when people become frustrated or angry and act accordingly. In addition, the agents can man the phones around the clock and unlike a human, they do not get tired or grumpy.

"Governments have a lot of data, particularly text contained in documents," says Rochanakij. "Because cognitive systems have natural processing capabilities and can understand language and text, there is big area of opportunity. For example, they can be used to go through years of child protection services case notes and understand systemic issues that may exist."

There will be more opportunities as technology becomes cheaper. According to Rochanakij, processing power equal to a human brain will be available for roughly US$1,000 (£806) within the next 20 years.

However, despite excitement around virtual agents, there are several issues preventing their wider adoption. Data quality is important to ensure the systems are trained optimally and this is difficult to manage. There are also cyber security implications: because many virtual agents are cloud-based, data sovereignty — rules governing the location in which information can reside — adds to complexity.

In addition, cognitive agents have not yet reached the point where they can mimic the human brain with complete accuracy. This will happen over time, says Rochanakij. "Language understanding has improved by 20 percent over the last two years, but at the moment we are only seeing basic interaction."

Currently, KPMG firms are working with clients to design systems that meld the intelligence of machines with humans, says Rochanakij. "In other words, we are augmenting the human intelligence, not necessarily completely replacing it."

Therefore, the best is yet to come. "There will be many exciting advances to look forward to over the coming 12 to 18 months," says Rochanakij. "And the next few years will likely see the emergence of life-like digital avatars able to select the most appropriate persona to engage with a citizen."

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* This content was originally published on the KPMG partner zone on the Guardian public leaders network on 5 December 2016.

[1] Robot Amelia — a glimpse of the future for local government. (4 July 2016). Retrieved 1 December 2016, from https://www.theguardian.com/public-leaders-network/2016/jul/04/robot-amelia-future-local-government-enfield-council.

[2] 8 Polish Cities Reach to Cloud for Smarter Public Services. (n.d.). Retrieved 1 December 2016, from https://www-03.ibm.com/press/us/en/pressrelease/41231.wss.

[3] Reed, M. (n.d.). Chatbot Joanne, Inland Revenue Authority of Singapore | Virtual Assistant Joanne | Virtual agent Joanne | Chat bot Joanne | Conversational agent Joanne | (12320). Retrieved 1 December 2016, from https://www.chatbots.org/virtual_assistant/joanne/.

Further reading

Here are some further articles from *@gov*, not necessarily related to the theme of 'data driven government' but still relevant for those interested in public sector technology and innovation.

Find more insight from *@gov* online at kpmg.com/atgov.

Autonomous vehicles article series.
Special *@gov* feature that explores the key issues where driverless cars will have a significant impact, helping authorities to start to envision a blueprint for the design and implementation of an AV-powered community of the future.

— **Autonomous vehicles: the public policy imperatives**
The five areas where AVs will have significant implications for public policy and service.

— **A fast track to fund autonomous vehicles**
Autonomous vehicles are creating an opportunity for governments to rethink and improve funding models for next-generation transport infrastructure.

— **Shape-shifting cities**
How self-driving cars will exert a major influence on where citizens choose to live, work and travel.

The power of mobile apps: Human services from the citizen's perspective
While the increased use of mobile technology presents considerable opportunity, governments must design app-based solutions from the perspective of the end user.

How governments can better safeguard their supply chains against cyber risks
Exposure to cyber risk escalates as governments embrace new technologies and service providers, but smarter third-party risk management strategies are helping them engage safely.

How human services providers are achieving digital transformation
Achieving transformation is one thing; maintaining it is another. An effective digital transformation strategy has to take a long-term approach to ensure that change is manageable and that systems do not become unwieldy or obsolete.

KPMG's Global Government & Public Sector practice

Around the world, all levels of government and public sector organizations are facing pressures from financial crises to constituent upheaval to rapidly urbanizing populations. How they choose to address these challenges impacts every part of a country's economy. KPMG's Global Government & Public Sector practice works to deliver meaningful results through a deep understanding of the issues, an intimate appreciation of how the public sector works, and global and local insight into the cultural, social and political environment.

KPMG Government & Public Sector professionals, many of whom have held senior public sector roles, consistently strive to combine their practical, hands-on local experience with insight from our global network to help our clients implement transformational strategies, economically, efficiently and effectively.

We understand the continuing impact of innovation and disruption on governments as they search for more

efficient ways to deploy technology to empower change within their organizations. Our professionals work across a broad range of sub-sectors and areas including digital transformation, D&A, cyber security and technology enablement to provide integrated, holistic advice.

Whether looking to improve operational efficiency or drive more value from existing infrastructure or manage challenges associated with delivering better services for less, KPMG's local teams bring an innovative but practical approach to problem solving that reflects their keen understanding of the public sector operating environment and relevant private sector insights to achieve sustainable results.

For further information, please visit us online at kpmg.com/government or contact a member of our Editorial Board.

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