

# Cognitive Government

*Enabling the data-driven economy in the cognitive era*



## Introduction

Government leaders have to consider and weigh many variables as they undertake the mission to improve the lives of citizens. They are continually challenged to improve program outcomes, optimize service delivery, and strengthen security, safety and resilience. They face these challenges knowing they have to build capabilities to identify hidden patterns, apply insight with speed and build knowledge that will better enable them to enhance and protect the economic vitality of the citizens and communities they serve.

Economic vitality is a holistic process and minor changes in existing patterns can hamper the objective of establishing an agile and sustainable economy. In today's knowledge-based, data-driven economy,<sup>1</sup> governments need the ability to understand what the trends and predictive indicators are in critical systems like employment, public health, education, financial markets, public safety, transportation and natural resources. They need to understand and model how these factors will influence areas like human resources, financial management, technology and security. Having access to a technological platform that can continuously adapt to build data-driven insights based on analytics and cognitive capabilities has never been more important.

The global economy and society as a whole are moving into an era where the ability to access, analyze and apply insights with speed is a game-changer in both the private and public sectors. Technologies that have the "ability to think" are helping public sector organizations augment human capabilities by analyzing vast streams of information, predicting outcomes, and giving leaders the ability to make better decisions. Systems that think and reason are the leading edge of new cognitive computing capabilities and are creating the opportunity for government organizations to improve program outcomes, revitalize citizen engagement and tune the engines of commerce in ways never before possible.

The resulting cognitive era is being sculpted by computing systems that learn at scale, reason with purpose and interact with humans naturally. These systems can ingest vast quantities of structured and unstructured data—from numbers and text to audio, images, sensors and social media—to form hypotheses, reasoned arguments and recommendations to help leaders build data-driven insights quickly and with confidence. And in government, cognitive capabilities can help organizations better understand critical trends and develop insights at scale to accelerate improvements for citizens and systems in areas such as public health, education, economic development, public safety and the utilization of natural resources.

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For many organizations, however, the challenge is not that they don't have enough data, it is that they don't have the digital capabilities to harness the power of the data they do have. Globally, 2.5 quintillion bytes of data are created each day, and with the expansion of technologies like the Internet of Things, mobile and cloud, the rate of data creation will only grow.<sup>2</sup> This data expansion creates challenges because most of that information is unstructured and siloed, which minimizes its usefulness in building insights or making informed decisions. The development of analytics and cognitive capabilities is

changing this and allowing government leaders to identify patterns and act on insights that might otherwise take years to uncover.

Within health agencies, for instance, disparate databases can make it difficult for caseworkers to differentiate claims for life-saving treatments from the hundreds of other requests in their queue. Evolving cognitive approaches can allow employees to get the information they need quickly. Instead of poring through multiple systems, caseworkers can simply pose natural language questions like, “How many cases involve acute or life-threatening conditions?” and “For individuals with those conditions, what is the most effective treatment protocol and how do we fast-track approval?” The same approach can be taken to help tax agencies eliminate fraud. And security analysts can identify threats amid complex data sets.

A recent IBM survey found that 83 percent of government leaders familiar with cognitive computing believe it will have a critical impact on the future of their business.<sup>3</sup> The technology must be strategically developed and judiciously applied, especially when managing the personal information of private citizens. But done right, cognitive computing is poised to address many enduring challenges affecting government administration around the world while creating new opportunities to expand and improve the quality of service.

### **How Cognitive Computing is Improving Outcomes Today**

As globalization reshapes trade and commerce, agencies know they must be more agile and creative in fostering economic vitality. Many are pushing hard to improve their IT infrastructures and digital capabilities to enhance program outcomes, make budgetary resources stretch further and broaden access. The promise of the cognitive era makes these efforts all the more important.

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Some early movers have already begun to put cognitive in the field. Administrators at a national customs agency, for instance, are employing cognitive capabilities to sift through vast amounts of structured and unstructured data to investigate cases of fraud and non-compliance. They're finding patterns among complex relationships that would take the agency's own analysts years to discover on their own. In addition to detecting traditional indicators of fraud, the cognitive system is extrapolating from tens of thousands of data points how fraud practices are likely to evolve. Those patterns can be visualized, contextualized, and weighted by confidence giving administrators greater predictive insights and credible information upon which to base their decisions.

Cognitive tools are also being used to improve the quality of citizen engagement. One government agency in Asia is using the cognitive capabilities found in IBM's Watson Engagement Advisor to handle inquiries from citizens directly, enabling them to find the information they need using a natural language interface. As residents interact with the system, Watson learns and evolves, fine-tuning and improving the quality of information that it provides. As a result, the agency is able to deliver faster and more personalized service.

Similarly, a city in Europe that serves a population of more than half a million people has begun using a cognitive platform to help address long-standing issues in the evaluation and distribution of welfare benefits. By building a capability around

advanced analytics, the city was able to measure an array of welfare applicant data from many different sources, from spending habits and medical information to biographical data, such as citizenship and criminal records, in seconds. The city is now able to understand complex relationships among recipients, households and programs to increase the number of eligible citizens enrolled in the welfare program and remove those deemed ineligible.

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## How to start the cognitive journey

### 1. Build a robust Digital Agenda

The path to cognitive begins with a data-driven governance and operating model. Across government organizations, many challenges can be solved by building integrated, data-enabled IT services that are shared across agencies. It's critical that agencies establish a well-integrated operational model that is built on data analytics and that leverages cloud technologies. This IT infrastructure needs to be tuned for big data and cognitive workloads. Government organizations need to develop the IT capabilities that allow them to fast-track digital applications and harmonize technologies from public, private and hybrid cloud with distributed devices, Internet-of-Things instrumentation and existing systems. All of this must be done with strong security elements that protect systems and sensitive information.

Doing this well requires a clear governance model and technology platform. Agencies must also establish a well-integrated operational model, one built to take advantage of cloud, analytics and cognitive capabilities. This digital foundation will allow government organizations to begin building out their digital agendas to take advantage of the emerging cognitive computing era.

### 2. Prepare a cognitive foundation

The single most critical foundation of a successful cognitive organization is digitization of data. If data cannot be ingested by a cognitive system, it cannot be analyzed by a cognitive system. So the work in which all agencies are currently engaged—digitizing information and processes, moving data to the cloud, building analytics capabilities—are prerequisites for success with cognitive computing.

#### Other areas of preparation include:

- **Investing in human talent**—Cognitive systems augment and rely upon human intelligence and capabilities. Cognitive solutions are “trained,” not programmed, and they “learn” with interactions, results and new pieces of information to help organizations scale expertise. Therefore, it is vital that organizations invest in the human capabilities to make machine-based cognitive capabilities a reality.
- **Build and help ensure a quality corpus**—Cognitive systems are only as good as their data. Invest adequate time in selecting data to be included in the corpus, which might include structured (e.g., account information) and unstructured data (e.g., sensors, blogs, videos) from multiple databases and other data sources and even real-time data feeds and social media. Data will likely emanate from new and untapped sources as well (e.g., call center recordings, audio files, agency web pages). In addition, invest in records digitization to secure the future of your organization's corpus, focusing on both historical and new documentation.

- **Consider policy, process requirements and impacts—**  
Assess any potential impact on processes and how people work. Because users interact with cognitive systems in entirely different ways than traditional input/output systems, processes and job roles could be impacted. In addition, consider if any data policy changes are necessary. Obtaining necessary data could test the boundaries of existing data-sharing policies and might require modifications to existing policies, regulations and agreements, particularly in agencies where security, privacy and other regulations are stringent.

### 3. Manage the change

Compared to traditional programmable systems, cognitive systems have the potential to radically redefine your business model. As such, change management is more critical than ever.

#### **Ensure leadership involvement in the cognitive journey—**

Senior-level involvement should begin with active participation in defining the cognitive vision and roadmap and continue throughout the journey. This includes senior management participation in regular reviews of incremental progress and value realization.

#### **Communicate the cognitive vision at all levels—**

Because cognitive computing is new and not completely understood by most, regular communication at all levels is critical. Address any fears, uncertainties and doubts head on, and leverage executive sponsors to reinforce the value of cognitive to your institution's mission.

#### **Continue to raise the cognitive IQ of the organization—**

Education is critical in assuring that cognitive is understood and adopted. Of particular importance is managing expectations related to system-generated recommendations. Cognitive systems are probabilistic and not deterministic.

While accuracy rates will improve as systems learn over time, the rate will never reach 100 percent. Educate stakeholders early-on about accuracy rates, and conduct regular reviews on incremental improvements.

### Conclusion

To function effectively in the cognitive era, public sector organizations must commit to building a digital agenda, with a governance model and technology infrastructure that prioritizes building data-driven insights as a core principle to connect people, organizations and systems.

Whether it is leveraging cloud delivery platforms, applying analytics or developing robust digital agendas that will enable cognitive systems, IBM can help. Cognitive capabilities like Watson are already helping clients in 25 countries and 20 different industries uncover hidden patterns, apply insights with speed and build knowledge. Combined with our deep industry expertise, and security capabilities trusted by more than 10,000 clients in 133 countries, we believe that IBM is well positioned to help government clients develop and deploy a robust digital agenda that will transform their operations, deliver a safe, secure, data-driven insights capability and allow them to take advantage of the cognitive era.

### For more information

For more on what the cognitive era means for government, read IBM's Institute for Business Value Report, "[Mission Possible: Your Cognitive Future in Government](#)."<sup>4</sup> Also visit [ibm.com/government](http://ibm.com/government) and follow us on twitter [@ibmgovernment](https://twitter.com/ibmgovernment)



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Produced in the United States of America  
March 2016

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1 For a good overview of the impact of data on society what a data driven means consult the recent Business Software Alliance (BSA) study from December 2015. *What's the Big Deal With Data*, ([http://data.bsa.org/wp-content/uploads/2015/12/bsadatastudy\\_en.pdf](http://data.bsa.org/wp-content/uploads/2015/12/bsadatastudy_en.pdf))

2 Ibid.

3 *Mission Possible: Your Cognitive Future in Government*, IBM, 2015, (<http://ibm.co/1Tbj77D>)

4 Ibid.



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