

IBM Institute for Business Value

# The power of analytics for public sector

*Building analytics competency to accelerate outcomes*



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## IBM Institute for Business Value

IBM Global Business Services, through the IBM Institute for Business Value, develops fact-based strategic insights for senior executives around critical public and private sector issues. This executive report is based on an in-depth study by the Institute's research team. It is part of an ongoing commitment by IBM Global Business Services to provide analysis and viewpoints that help companies realize business value. You may contact the authors or send an e-mail to [iibv@us.ibm.com](mailto:iibv@us.ibm.com) for more information. Additional studies from the IBM Institute for Business Value can be found at [ibm.com/iibv](http://ibm.com/iibv)

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By *Hammou Messatfa, Lynn Reyes and Michael Schroeck*

**In the face** of mounting complexity, smarter, collaborative, fact-based decisions are more important than ever to drive results. Today's unprecedented "information explosion" can paralyze government and other public sector organizations as they address increasingly intertwined public issues. Yet, a historic opportunity exists to accelerate desired outcomes by embracing analytics as a core management competency. It's time to demonstrate greater value to the public sector's ever-watchful constituents.

Complex societal, economic, political and environmental pressures are placing intense demands on public sector organizations to make smarter decisions, deliver results and demonstrate accountability.

An unprecedented "information explosion" both facilitates and complicates the ability of governments and institutions to achieve and influence desirable outcomes. A tremendous opportunity exists to use the growing mountain of data to make better, fact-based decisions. Yet, the volume of data and its increasingly diverse and interactive nature can also paralyze organizations as they try to separate the noteworthy from the not-worthy.

Analytics goes beyond reporting and provides the mechanism to sort through this maelstrom of information and help governments respond with informed decisions.

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#### **Analytics**

is the use of data and related business insights developed through applied analytical disciplines (e.g., statistical, contextual, quantitative, predictive, cognitive and other models) to drive fact-based planning, decisions, execution, management, measurement and learning.

#### **Analytics competency**

is an organization's capacity to use analytics in an expanded, systemic manner and advance it as an enterprise skill. This is accomplished by embedding three interrelated dimensions within organizations: analytics talent, analytics capability and analytics leadership.

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How are governments and public institutions applying analytics today, and how might they need to think about its future use? What are the implications for public sector organizations? How should agencies advance their analytics competency in today's complex environment?

To answer these questions, we interviewed more than 100 public sector leaders from around the world and conducted extensive secondary research (see Appendix, page 20). This study is intended as a first step in identifying how analytics can help address a broad range of public issues.

#### What our research uncovered

Governments are increasingly using analytics to consume, unlock and apply new insights from information, despite challenges with data. Executives told us the “data paradox” – the dilemma presented by too much data, too little insight – is the biggest barrier to analytics adoption and use. They also expressed concerns about data reliability. The more qualitative the information, the less confident they are in the dependability of their data.

Our research shows most public sector organizations are just starting to explore ways to leverage analytics to manage for results. A select number of organizations are “going pro” and developing analytics leadership. These leaders are looking for analytics capabilities that help them optimize choices and inform decisions with new and predictive insights.

Over the next three years, these “pros” expect their analytics talent to become more anticipatory and open to the expertise of others. They anticipate talent will become more efficient in exploiting data and more attuned to performance.

Today, however, most organizations spend more time collecting and organizing data than analyzing it. Analytics talent also tends to be more concentrated within organizations, rather than pervasive across them. This can make it more difficult to discover useful insights that can only be obtained by looking at information across multiple agencies and databases.

To capitalize on its potential power in the public sector, analytics must become a core management competency. Building competency will require organizations to focus on four strategic imperatives:

1. Focus on outcomes to move beyond issues
2. Orient the management of information around its use
3. Use analytics-enabled insights to meet specific objectives
4. Model and embed analytics discipline in management practices.

Our research also shows that organizations fall within four categories of analytics competence, depending upon the extent of their analytics vision and practice: *Starters, Foundation Builders, Practitioners and Virtuosos* (see page 9). Most organizations are Foundation Builders. This means they have a good information base and related practices, but more work is required to predict future outcomes with confidence.

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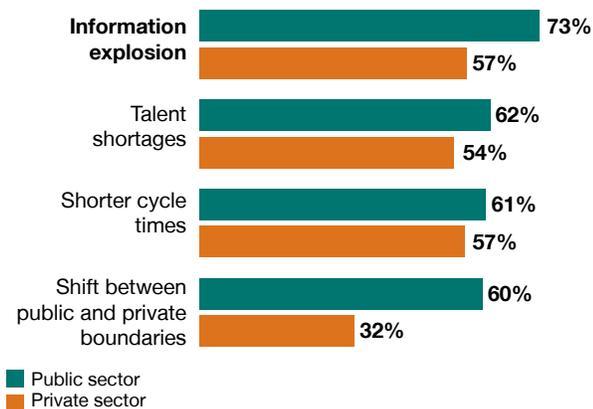
*Most public sector organizations are just beginning to use analytics to affect outcomes.*

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## Immense complexity – new challenges and roles for analytics

Governments around the world have been affected by economic fluctuation. Many governments are either burdened with deficits or contending with the mounting cost of public administration. Increasing complexity, volatility and uncertainty compromises their ability to demonstrate fiscal responsibility.

Public sector leaders interviewed for the 2010 IBM Global CEO Study said the most significant drivers of complexity were the information explosion, talent shortages and shorter time cycles (see Figure 1).<sup>1</sup> These drivers are at the heart of effective decision making.



Source: IBM Institute for Business Value.

Figure 1: The information explosion was cited by executives interviewed for the IBM Global CEO Study as the most significant driver of increased complexity.

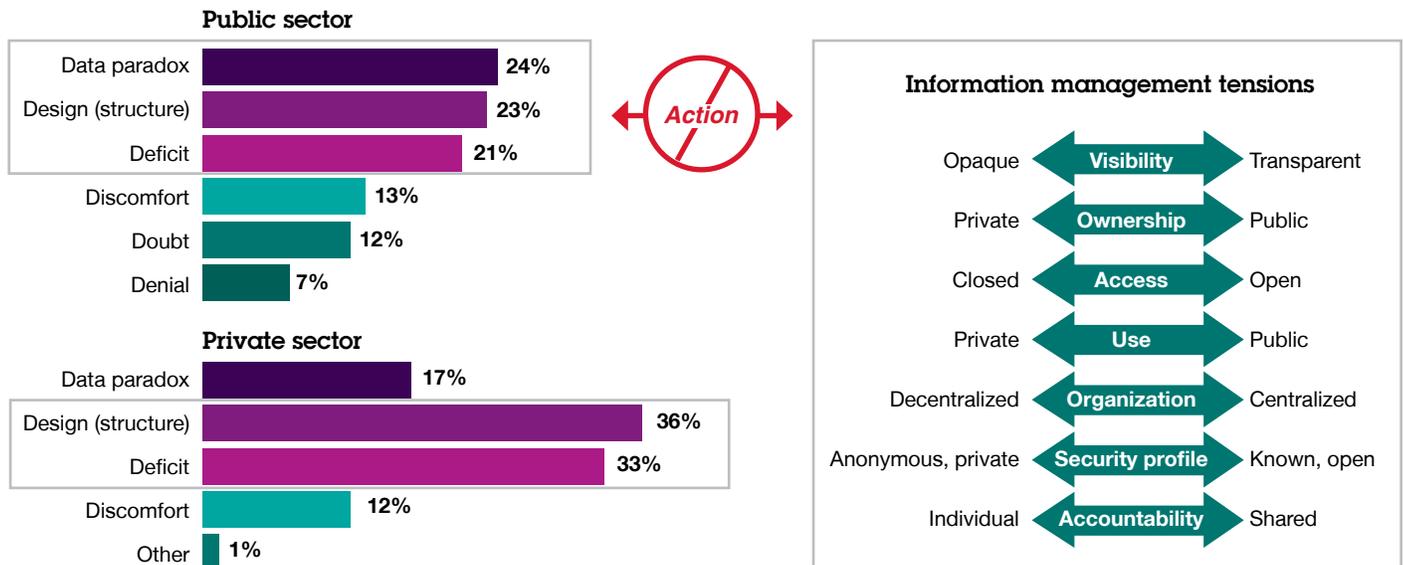
*“Across the country, all are struggling at a minimum level to figure out how to deliver services. For those at the leading edge . . . [it’s]... rethinking and finding new models . . . new ways to deliver services and think of what the local government of the future would look like.”*

Christopher Hoene, Director of Research and Innovation, National League of Cities, USA.

### Irony and possibility

More information is available today than necessary to make effective decisions. “There is too much information already,” said one North American public sector official. “We need not just more relevant information, but to eliminate the irrelevant information that is reported.”

Public sector leaders told us the biggest barrier to more systematic analytics adoption and use is the “data paradox.” The combination of this paradox and the information explosion can exacerbate information management tensions and stymie effective action (see Figure 2).



Source: IBM Institute for Business Value.

Figure 2: The data paradox is the biggest barrier to analytics adoption and use and exacerbates information management tensions that already exist.

The glut of data creates challenges in getting the potential value from massive amounts of data that organizations collect, store and manage. For example, the variety and volume of uses and users of public sector information (PSI) is increasing (see Figure 3). Public sector information is expected to be inherently accessible and transparent.<sup>2</sup> For example, a recent study showed that 68 percent of private sector organizations were unwilling to share data with their customers, but 83 percent believe they should be entitled to greater access to government data.<sup>3</sup>

Increasingly sophisticated “ingredients” – information, analytical models/techniques, analytics tools and technologies – are available to public sector organizations. But leaders told us they have a long way to go to realize the potential of analytics. Many factors contribute, such as the volume and variety of information, the reliability of data and analytics talent that focuses on data collection and reconciliation rather than insight development. For example, our survey reveals that public sector analytics professionals spend 47 percent of their time collecting and organizing data. Less than a third of their time is spent on sophisticated analysis.

Uses of PSI	Users (examples)		Types of outcomes	Examples of outcomes
<b>Improve public services and public administration</b>	<ul style="list-style-type: none"> <li>Mission or program constituents</li> <li>Employees</li> </ul>	<ul style="list-style-type: none"> <li>Policymakers</li> <li>Agency heads</li> <li>Politicians</li> </ul>	<ul style="list-style-type: none"> <li>Mission outcomes</li> <li>Program outcomes</li> <li>Operational results</li> </ul>	<ul style="list-style-type: none"> <li>Enhanced economic security of low-income workers</li> <li>Reduced risk of recidivism</li> <li>Reduced unit cost per outcome, increased productivity</li> </ul>
<b>Increase social and economic benefits to taxpayers</b>	<ul style="list-style-type: none"> <li>Communities</li> <li>Taxpayers</li> </ul>	<ul style="list-style-type: none"> <li>Citizens</li> <li>Politicians</li> </ul>	<ul style="list-style-type: none"> <li>Public outcomes</li> <li>Taxpayer outcomes</li> <li>Policy outcomes</li> </ul>	<ul style="list-style-type: none"> <li>Safe and vibrant communities</li> <li>A sustainable safety net</li> <li>Improved access to education</li> </ul>
<b>Enhance citizens' awareness of their rights</b>	<ul style="list-style-type: none"> <li>Citizens</li> <li>Policymakers</li> </ul>	<ul style="list-style-type: none"> <li>Politicians</li> </ul>	<ul style="list-style-type: none"> <li>Citizen outcomes</li> <li>Policy outcomes</li> </ul>	<ul style="list-style-type: none"> <li>Increased trust in government</li> <li>An engaged citizenry</li> </ul>
<b>Promote excellence in research and development</b>	<ul style="list-style-type: none"> <li>Scientists and researchers</li> </ul>	<ul style="list-style-type: none"> <li>Investors</li> <li>Businesses</li> </ul>	<ul style="list-style-type: none"> <li>Scientific outcomes</li> <li>Environmental outcomes</li> </ul>	<ul style="list-style-type: none"> <li>Accelerated discovery of cures, safer drugs</li> <li>Sustainable resources, improved environmental safety</li> </ul>
<b>Foster economic growth of information-related industries</b>	<ul style="list-style-type: none"> <li>Businesses</li> <li>Investors and entrepreneurs</li> </ul>	<ul style="list-style-type: none"> <li>Citizens</li> <li>Workers</li> </ul>	<ul style="list-style-type: none"> <li>Business and industry outcomes</li> <li>Citizen outcomes</li> </ul>	<ul style="list-style-type: none"> <li>Differentiated products and services, access to skilled workforce</li> <li>Higher-quality jobs</li> </ul>

Source: IBM Institute for Business Value.

*Figure 3: PSI users include the general public, scientists, researchers, businesses and others. The outcomes facilitated by this information reach far beyond individual governments and agencies.*

Apathy is, perhaps, the biggest contributor to the relative lag in public sector analytics usage. Only a third of the participants in our study felt the external environment is sufficiently disruptive and uncertain today – or would become so within the next three years – to require new courses of action. We believe several “blind spots” – structure, budget and skills deficits, discomfort – cause them to underestimate how a complex environment affects their operations (see Figure 2, page 4).

Accepting that today’s new economic and societal environment is dynamic and disruptive may be the first step toward building the information and analytics foundation necessary to enable more efficient service delivery, while delivering the transparency and accountability constituents demand.

*Many public sector officials do not believe that today’s environment is very disruptive and uncertain.*

## Analytics: The essential competency

The combination of analytics capabilities (tools and technologies), analytical models and techniques, and talent puts executable insights within reach of the public sector. Analytics competency – the ability to target where and why to apply analytics – is key.

New insights from data can yield measurable results and affect lives. For example, in 2005, the Memphis (Tennessee) Police Department, facing rising crime rates and shrinking budgets, collaborated with the University of Memphis' Department of Criminology and Criminal Justice and the Mayor's office to create Blue CRUSH (Criminal Reduction Utilizing Statistical History). As a result, the department, using insights based on a predictive analytical framework that identified crime "hot spots" based on historical and real-time crime data, was able to more efficiently allocate resources and reduce serious crime by 30 percent, violent crime by 15 percent, and quadruple the number of solved cases.<sup>4</sup>

Assessing analytics competency – the enterprise's capacity to use analytics in an expanded, systematic manner and advance this skill in the enterprise – is accomplished by embedding three interrelated dimensions: analytics talent, analytics capability and analytics leadership.

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*Translating the context of issues into the right questions is an essential skill for analytics professionals.*

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## Analytics talent

There is no substitute for talented people who can translate the context of issues into the right questions. These questions, in turn, become the data that matters. Success today requires increasingly sophisticated combinations of knowledge, technical expertise and insight.

Many agencies have pockets of talented analytics professionals. Sixty-one percent of our respondents said their analytics talent is primarily inside the organization; only 21 percent said their talent was sourced externally. The placement of their analytics talent also tends to be contained. Forty-three percent said talent is concentrated within a single unit, compared to only 22 percent with talent fully integrated into their organizations. Government and other public sector organizations will need to explore new talent management models for analytics skills. Particularly, they need to consider three important factors:

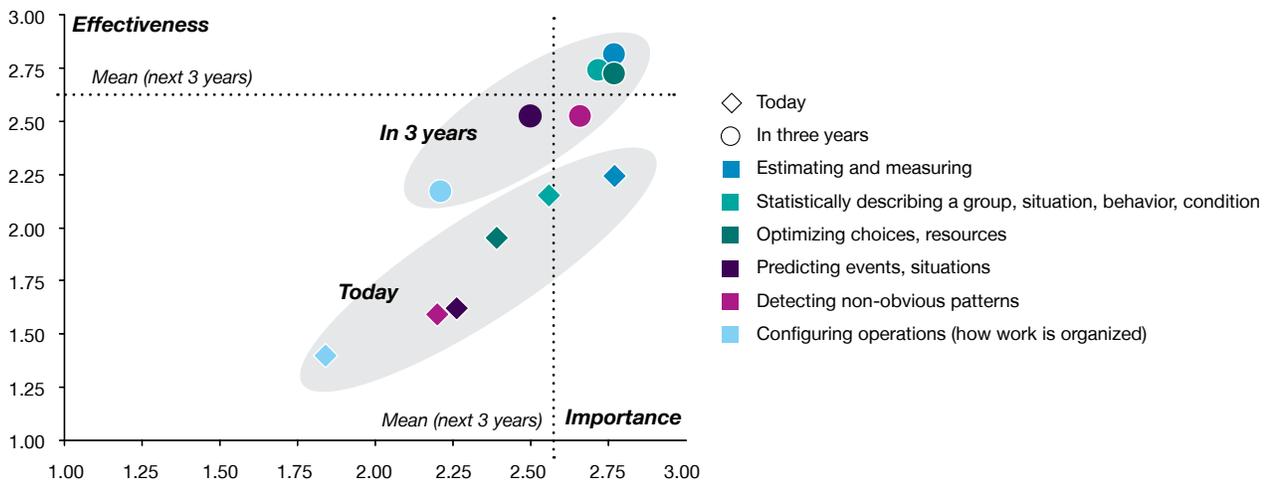
- **Mindset:** To make the most of their talent, organizations should foster more creative, anticipatory and strategic mindsets in their analytics professionals. For example, new, cognitive analytics techniques can be combined with statistical ones to uncover patterns and determine interventions that reinforce positive outcomes.
- **Ways of working:** Analytics talent needs to become more agile, collaborative and "interdisciplinary," and less reliant on instinct and intuition. For instance, professionals who deliver services to citizens can collaborate with risk managers to determine predictors for undesired outcomes and tailor programs accordingly.
- **Problem solving:** Greater integration into decision making is needed to operationalize and measure data-driven, analytics-enabled insights. For example, when new insights are uncovered, they can be used to make strategic planning and measurement more dynamic.

**Analytics capability**

Analytics capability consists of tools and technologies to make data consumable, insightful and predictive. In comparing the importance versus effectiveness of key analytics capabilities today and in three years, we found most organizations varied widely in how they assessed where they are against where they need to be (see Figure 4). Not surprisingly, respondents scored well in classic analytical techniques. The fact that configuring operations was so low in effectiveness may reflect a resigned acceptance of the difficulties of accomplishing such a task in public organizations.

In three years, an interesting clustering occurs. First, the expected improvement of classical analytical techniques suggests a need to make better choices within constraints. Techniques that enable informed choices and new insights become dramatically important. Although configuring how work is organized still remains low, its jump in importance suggests respondents recognize this is a critical enabler, difficulty notwithstanding.

**Importance versus effectiveness of key analytics capabilities**  
(Today and in three years, mean scores)\*



n > 102; mean, next three (3) years (scale 1.00 min, 3.00 max).  
 \* Less important = Grouped responses [1 / 2]; base requirement = responded [3]; Important = Grouped responses [4 / 5].  
 Source: IBM Institute for Business Value analysis.

Figure 4: Making better decisions remains the top priority, but leaders want to inform them with new and more predictive insights.

### **Analytics leadership**

Participants in our study recognized the importance of strong, proactive analytics leadership, which is central to embedding analytics within an organization's culture, governance and management.

These leaders understand the inherent value of analytics to their decision making and actions. Most organizations are just starting to explore ways to leverage analytics to manage for results, but some are pushing analytics leadership.

For example, Singapore's government continues to address issues by pushing forward collaborative government to support broader desired outcomes, such as economic vitality and foreign investment.<sup>5</sup> Specifically, its Land Transport Authority (LTA) deployed the world's first congestion charging system and has since innovated elements of its business model. LTA has seen an 80 percent reduction in revenue leakage from "lost transactions," while tripling its performance capacity to 20 million fare transactions per day.<sup>6</sup> At the same time, its ability to look holistically across the network to help manage current demand allows it to predict future needs and sustainable solutions to accommodate a growing population.

With the complex challenges facing government and other public sector organizations, we believe proactive leadership, as evidenced by Singapore's example, can be the catalyst for unleashing the power of analytics.

### **Building mastery in analytics requires managerial innovation**

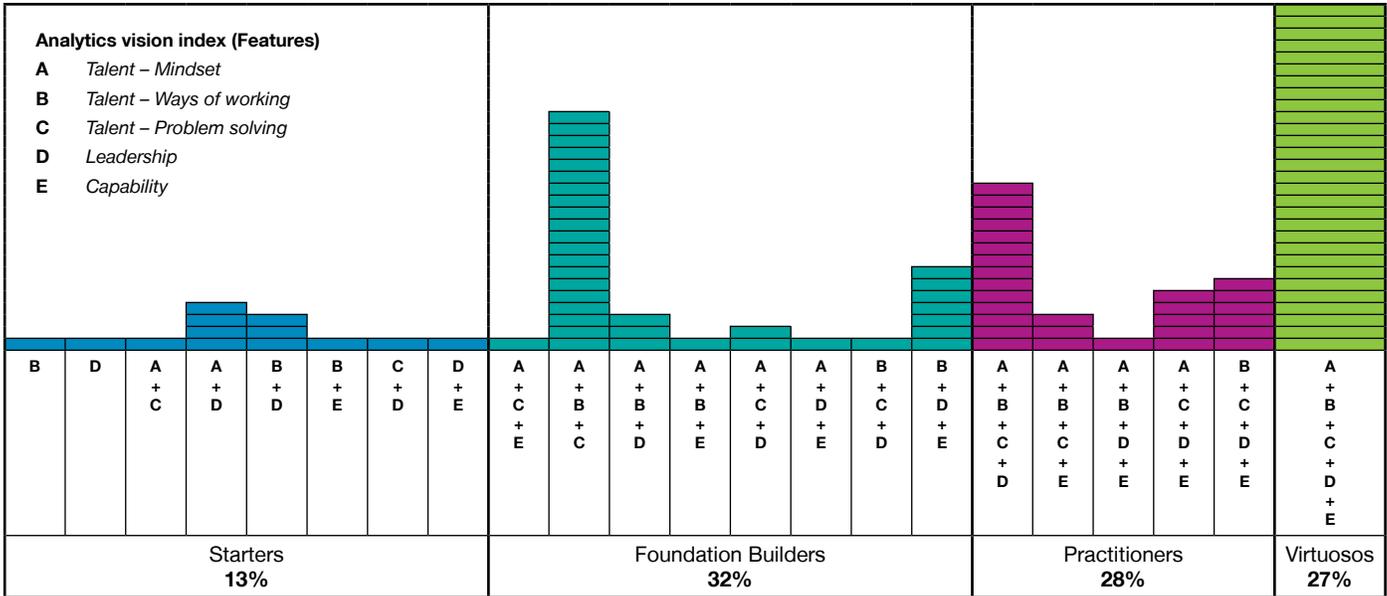
Our study sought to determine how and the extent to which the three dimensions of analytics competency were embedded within organizations. What we found is that a small group of agencies are forging a path that includes advanced analytics capabilities and analytics leadership. Most, however, while using analytics to some degree, are still struggling to master the basics relative to where they want to be.

We segmented organizations using an Analytics Vision Index (AVI) based on how intensely they applied five features of analytics competency (see Figure 5.) The categories are: Starters, Foundation Builders, Users and Virtuosos. As the AVI shows, Starters rely intensely on the "expert," as do Foundation Builders. Analytics tools and technologies and analytics leadership begin to appear more commonly with Practitioners and Virtuosos. Only Virtuosos demonstrate all aspects of analytics competency.

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*While many organizations are still struggling to master the basics, a small number of "pros" are forging a path of analytics leadership.*

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n = 107  
 Note: Developed based on statistical analysis of responses regarding the three dimensions of the analytics competency – talent, leadership and capability. There are 31 possible combinations for the AVI.  
 Source: IBM Institute for Business Value analysis.

Figure 5: How intensely organizations applied five key analytics features determined how they fell within the Analytics Vision Index. Starters used only one or a combination of two features, while Virtuosos incorporated all five.

**Starters**

Starters demonstrate one or combinations of two of the five key analytics features in their approach, largely focusing on talent. They spend more time on collecting data, perform simple analysis and are, generally, more reactive. They have limited ability to monitor events that could affect their missions. Additionally, the scope and scale of information they analyze is smaller than the other groups. They tend to outsource analytics functions. The immediate goal for these organizations is to define targets they can focus on today, such as productivity, and align them with the right measures.

**Foundation Builders**

Foundation Builders reveal combinations of three key features in their approach. They spend more time than Starters in collecting and organizing data. They concentrate on analytics talent. Foundation Builders sporadically show some aspects of analytics leadership and capability. They are most confident in the data underlying financial and stakeholder information. Measurement effectiveness is critical for this group. They focus on building performance management rigor.

### Practitioners

Practitioners show combinations of four of the five key features in their analytics approach. They are advancing analytics leadership and building analytics capabilities. Over the next three years, configuring how work is organized will be among their most important objectives. They are expanding their analytical capabilities, are more collaborative and are attempting to be more risk aware. The challenge for them is to determine what not to measure – so measurement clarity is critical for this group.

### Virtuosos

This group demonstrates all five key features. They are performing more complex analysis and enhancing measurement and information management. Virtuosos analyze a larger, more complex base of information and are agile in analysis, embedding insights and looking forward. Information sharing in the short term is a challenge for these organizations. They have a core of analytics talent and are increasing collaboration. Like Foundation Builders and Practitioners, measurement effectiveness is critical. Their immediate goal is to focus their intensity in applying the five key features to expand influence and collaboratively define outcomes and related indicators with other agencies and constituents.

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*Most organizations are more capable in descriptive analytics techniques, but less so in predictive techniques.*

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Foundation Builders accounted for the largest segment (32 percent) of organizations we interviewed. Practitioners, at 28 percent, were next. Twenty-seven percent were Virtuosos, and only 13 percent were Starters. These numbers indicate that most public sector organizations are well underway in their analytics journey.

### Distinguishing between competency and capabilities

It is important to make key distinctions between analytics competency and analytical techniques. In other words, the latter describes the potential of analytical techniques and the former describes how to apply them. Even as analytics techniques and capabilities continue to be rapidly developed, systematic use of these assets is a different story. There are three types of analytics techniques:

- *Descriptive* techniques deal with what has happened in the past, categorizing, characterizing and classifying historical (usually structured) data.
- *Predictive* techniques take the understanding of the past to predict future scenarios.
- *Prescriptive* techniques provide decision makers with sophisticated alternatives (insights created with substantial levels of speed, scale, currency, breadth and depth) to determine what the best responses might be.

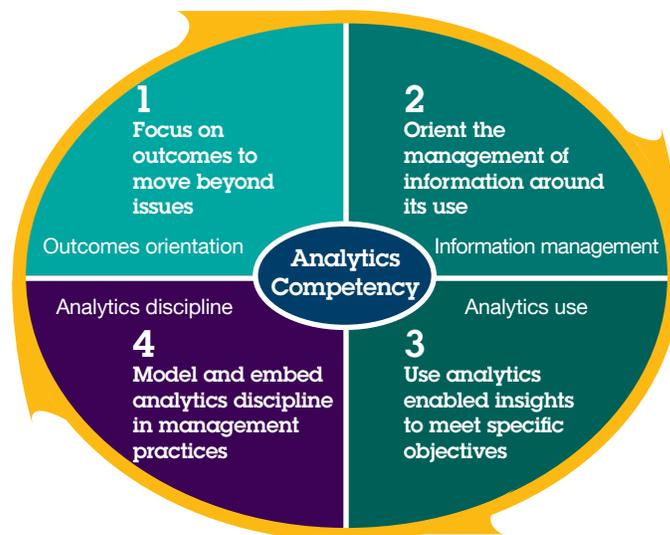
As a group, most public sector organizations are capable of using descriptive techniques and are less developed in predictive techniques. Most are Foundation Builders in predictive techniques. Each type of capability can progressively become the foundation for the next (see Figure 6).



Organizations must focus on four strategic management imperatives to realize the power of analytics in the public sector (see Figure 7). Leaders will need to embed analytics competency into their organizations for the long term. They should leverage leading practices from both the public and private sectors along the way.

*“While the opportunities from analytics for improving efficiency and effectiveness appear limitless, there is much less clarity about the readiness of the government sector to do so. Whereas analytics is largely depicted as a technological innovation (often described as “business intelligence”), the strategic use of analytics in both the private and government sectors also requires massive managerial innovation.”*

Thomas H. Davenport and D.J. Patil, “The strategic use of analytics in government,” IBM Center for the Business of Government, 2008.



Source: IBM Institute for Business Value.

Figure 7: Imperatives for building analytics competency.

## Imperative 1: Focus on outcomes to move beyond issues

### Expand and “see” your observation landscape

Issues suggest “what’s important” and “why” – and drive public sector organizations to act. They must be understood to frame the most important questions, as well as clarify or affirm the right outcomes. The most meaningful indicators of both performance and progress will need to be articulated to shape related business objectives. The importance of creating a well-defined information strategy and roadmap, based on key performance and progress indicators, cannot be overstated.

Disciplined conversation and collaboration and information governance are no longer optional – they are fundamental to drawing out the context and meaning that drives the definition of the data-that-matters. This is where the information architecture supporting outcome-based objectives is ultimately embedded.

Note one important subtlety: let the questions guide where to target interventions. Then, determine which activities or processes are affected and/or needed. This helps shift the data focus from collection to use. It can also help to “redefine the enterprise” based on outcomes and diminish change disruptions. It is easy to fall into the trap of “perfect data.” But, given the information explosion, this is an unwinnable battle. A new information management paradigm is needed to facilitate outcomes orientation.

This paradigm can be found among those agencies that have successfully managed challenges in productivity and efficiency, as well as the “blind spots” that make it difficult to focus resources on desired outcomes (see case study, “Alameda County, California.”)

## **Imperative 2: Orient the management of information around its use**

### **Manage questions as data**

The value of information is in how it can be applied. For example, command centers consider information, increasingly in real-time, that comes in various forms – including unstructured data like e-mail text, video, pictures, sound and color – and take action based on their understanding of the data.

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### **Case study: Alameda County, California<sup>7</sup>**

The Alameda County Social Services Agency was challenged to deliver better welfare outcomes, such as increased work participation and reduced risk of recidivism, despite increasing demand and fewer resources. Leveraging business intelligence software and analytical tools, Alameda created a “lifecycle” view of its customers’ interaction with county and state social service resources, informed by new insights from patterns. Instead of a patchwork, the agency’s departments were able to coordinate programs and service delivery, while at the same time removing the gaps between systems where errors and fraud can thrive.

The result: the identification of US\$11 million in fraud and waste reduction in the first year. And since 2009, an additional US\$9 million in savings has been identified. The application of analytics gives managers and caseworkers a deep, real-time understanding of case and program status, enabling them to find the best assistance programs for each situation. Alameda County has been able to uncover relationships between benefit recipients and programs, helping to eliminate waste, redundancy and fraud. The county is able to generate reports in minutes instead of weeks or months, allowing caseworkers to apply their expertise by trying “what if” scenarios.

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Agencies need to challenge existing assumptions about how they manage data. Information silos are rarely sustainable in an environment that demands accountability and transparency. Analytics leaders are fostering appropriate information sharing through information governance, standards adoption, new approaches and leading practices. Creating new analytics-enabled insights depends on strengthening the information foundation (see case study, “Caisse Nationale des Allocations Familiales (CNAF), France”).

### **Imperative 3: Use analytics-enabled insights to meet specific objectives**

#### **Combine internal, external data in new ways**

Organizations should target their analytics initiatives to create new business, operating and implementation models to help them achieve specific goals and objectives. They not only guide the targeting of analytics initiatives, but also the evaluation of their impact. Maintaining an inventory or registry of indicators, concepts and related analytics techniques can help avoid starting from scratch with each new initiative.

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#### **Case study: Caisse Nationale des Allocations Familiales (CNAF), France<sup>8</sup>**

CNAF, the French social services agency, provides €70 billion of benefits each year to 18 million beneficiaries through 123 delivery branches.

The agency had extensive ambiguous data about citizens, applicants and provider identities. Each of its branches had different versions of the data. Each time a citizen applied for a different benefit, CNAF had to ask for information it already had. Systems did not share data among branches, did not have up-to-date data among silos and were administratively inefficient.

Because of siloed systems, inadequate data matching and privacy restrictions, data updates were prone to error and attempts by citizens to defraud the system. Improper payment activity was creating work overload on both front line and back office personnel.

CNAF determined that to meet these challenges, it needed to integrate data, improve data quality and provide a “single version of the truth” to citizens, case workers, and providers

across multiple programs. CNAF also determined it needed a better way to determine benefit eligibility and deter fraud.

CNAF employed a master data foundation that provided the “single version of the truth,” along with an analytical understanding of citizen information. It also integrated identity and relationship resolution functionality to greatly enhance eligibility determination. The agency used analytics to help determine cases requiring audit follow-up.

As a result, CNAF gained a rapid understanding of citizens, applicants and providers across multiple programs, cases and locations. It increased effectiveness of providing the right service to eligible recipients and reduced the level of improper payments to ineligible persons. The agency was able to create a repository containing citizen information for shared use across multiple French Government organizations, while adhering to privacy restrictions. Ultimately, CNAF gained much better accuracy in identifying improper cases after audit and realized a 35 percent productivity gain through the use of analytics.

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It is important to look at different examples within and outside the public sector. Many private organizations perform functions similar to their public sector counterparts and have used analytics in powerful ways, such as in risk management, scenario planning and predictive models. Existing analytics methods and disciplines can be leveraged to create efficiency.

For example, analyzing patterns is a cornerstone of effective analytics. But predicting future behavior separates outperforming “pros” from the rest (see case study, “New York State Department of Taxation and Finance”).

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### Case study: New York State Department of Taxation and Finance<sup>9</sup>

The New York State Department of Taxation and Finance annually processes 24 million business and personal tax returns and collects more than \$90 billion in state and local tax payments.

Which refunds should not be paid? Which tax returns should be audited and investigated? What impact did non-compliance from improper payments and fraud have on those who were complying? Having the answers to these questions is key to collecting the right amount of tax revenue while maintaining confidence in the tax administration system.

A project to leverage information to transform the department’s operations resulted in a new approach that enables the identification of the pending case most likely to be questionable. The agency proactively identifies returns that are outliers and focuses constrained audit resources on those returns that seem most unusual.

Initially, the department created a data warehouse focused on improving audit case selection that gave access to the

history of each case and each return. Over time, the department has been able to use this data warehouse to analytically derive new business rules, find new patterns of questionable returns and add these rules to the system.

Most recently the data has been used to develop predictive models and employ predictive techniques, leveraging practices applied in the justice system. These behavioral models predict how likely a return is to be questionable, allowing the system to prioritize the cases that are least likely to be eligible. The system automatically rejects those refund requests that are clearly ineligible, preventing these cases from even entering the audit process. It then uses predictive models and business rules to make a decision as to the priority of each remaining case.

Overall, the system has saved the state more than US\$889 million, while allowing it to process refunds faster. It resulted in an increase from \$56 million in refund denials per year to more than \$200 million, without increasing staff levels. And it increased the percentage of audits that found questionable refunds.

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## **Imperative 4: Model and embed analytics discipline in management practices**

### **Develop and manage analytics talent as a “community”**

Creating an environment that encourages community, creativity, experimentation and integration into problem solving is particularly important as the environment becomes more complex. Leaders can help create discipline by modeling and reinforcing analytics excellence and linking it to manage-

ment practices. Of utmost importance is linking indicators of performance and progress to desired outcomes, which can further embed discipline.

Analytics discipline does not happen overnight. It starts with commitment and progresses with systematic and sophisticated actions. Many organizations might find performance to be an excellent starting point around which to embed discipline (see case study, “The UK’s Department of Work and Pensions.”)

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### **Case study: UK Department of Work and Pensions (DWP)**

DWP is responsible for delivering the government’s welfare, pensions and child support and is the largest service delivery department in the United Kingdom. It processes financial transactions with 17 million customers every week and processes benefits and pensions payments of more than £125 billion per year. Because it manages a very large percentage of the UK budget, DWP has implemented several changes in response to increasing pressure to demonstrate increased value for money.

DWP instituted an Integrated Planning and Performance Management Program (IPPM) and implemented an Activity Based Management (ABM) system. Moving from unit costing to activity-based costing not only improved the relevance of DWP’s financial information, it also provided greater transparency. And it promoted a culture of continuous improvement (productivity) and enterprise-wide performance management.

Included in the IPPM were plans to expand the value of ABM by building on DWP’s information foundation to perform data-driven forecasting, scenario planning, benchmarking and other performance management analytics.<sup>10</sup>

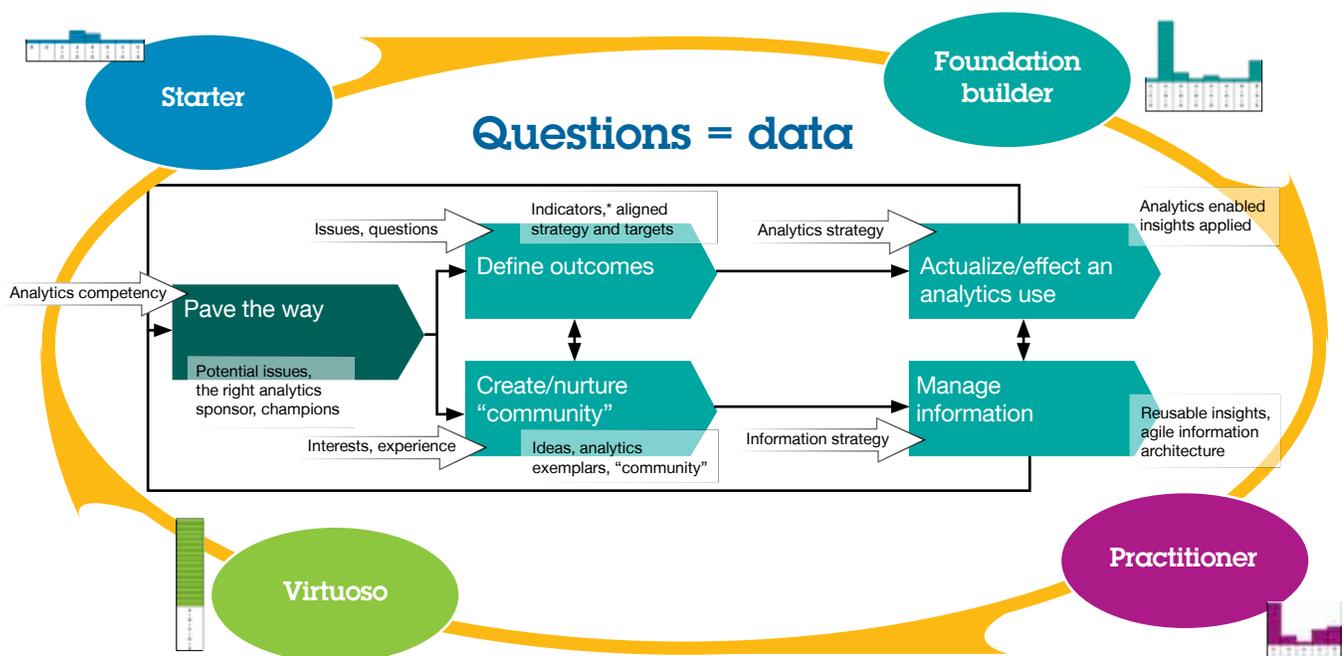
Since implementing these programs, DWP has been developing new analytics-enabled insights and approaches to tackle fraud and error, increasing intervention coverage from 123,000 interventions to 1 million last year, and increasing yield from £253M to £770M.<sup>11</sup> Further, it has segmented its customers by age to better predict future benefits and payments.<sup>12</sup>

### Getting started, or building momentum

It all starts with defining issues and desired outcomes. Asking the right questions not only illuminates the data that matters, but also brings objectives and targets into focus – both from a performance and progress perspective.

While an iterative approach should be taken based on where you are starting from, take the opportunity to be bold (see Figure 8). Three principles can help guide the journey:

1. Questions equal data (or, the data that matters is a question that requires a decision).
2. If you treat questions like data (and the answers like insight and intelligence) then you won't have to ask them all the time.
3. Analytics "communities" can help build and sustain both analytical depth and synergy – as long as collaboration isn't an exception.



\* Outcomes-based.  
Source: IBM Institute for Business Value.

Figure 8: Building analytics competency is a continuous journey. Define issues and outcomes well and make sure they are understood. Ask questions and take an iterative approach.

It is quite possible to be a Virtuoso in descriptive analytics techniques and related capabilities, but a Starter or Foundation Builder in predictive and prescriptive analytics approaches. So be prepared to map out different paths depending on where you are starting from and where you want to be. But let the issues, questions and indicators guide you.

For example, in focusing on outcomes, Starters may want to look first at what outcomes to target and narrowly focus efforts on productivity. Foundation Builders may focus more on what to establish as foundational capabilities and the right measures to affect an outcome. Practitioners may need to determine what not to measure and how to streamline data collection and analysis. Virtuosos may seek to expand performance and create multiple progress indicators.

In learning how to focus information around its use, Starters will want to leverage existing models and apply leading practices. Foundation Builders should look to establish basic reference models and focus on platform rationalization. Practitioners can leverage partnerships, build new reference models and begin assessing external data. Virtuosos may establish new business models for managing their information environment and begin sharing indicator registries.

For applying analytics-enabled insights, Starters will concentrate on increasing the visibility of the uses and results of their data collection and analysis. Foundation Builders will extend the role of analytics in their programs, planning and management. Practitioners will be combining insights, broadening the scope of their programs and deepening their planning and management roles. Virtuosos will focus on advanced, collaborative and interdisciplinary application of analytics.

In analytics discipline, Starters will likely need mentoring and should focus on delivery, operations and management. Foundation Builders will want to establish a consistent and focused analytics role. Practitioners should “get out of the box” and explore new roles and integrate as many existing roles as possible. Virtuosos might create or participate in innovative, systemic analytics communities.

Regardless of the individual actions to take, success in building analytics competency will ultimately depend upon committed leaders who take a strategic focus on the four imperatives we’ve outlined. To address increasingly complex public issues in an interconnected world and accelerate outcomes, public sector organizations will need to use analytics to leverage the information explosion and embed analytics competency into their organizations for the long term.

Analytics competency is the next managerial innovation in the public sector. Multiple paths lead to progress. Leadership and collaboration are essential to the journey.

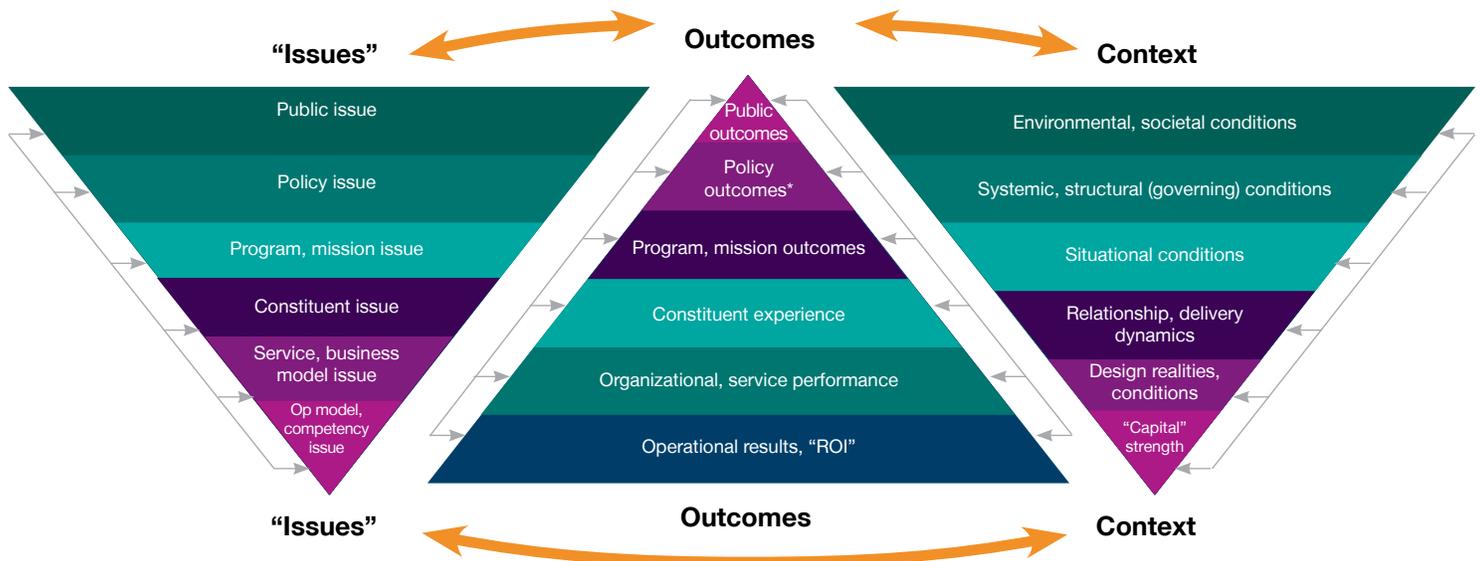
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*Building analytics competency will require committed leadership and collaboration.*

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### Questions to ask to get started

1. To what extent are you using analytics to:
  - Define the issues (see Figure 9)?
  - Achieve or influence desired outcomes?
  - Answer the questions that will inform your observations and decisions?
2. How are you informing those decisions today?
  - Do you have a good sense of the risk, impact and consequences of your decisions and actions along the way?
  - What would happen if you did NOT change the way you manage information?
3. Where are you (and where do you need to be) in developing analytics competency?
4. What will it take to make the case to use analytics to solve problems?



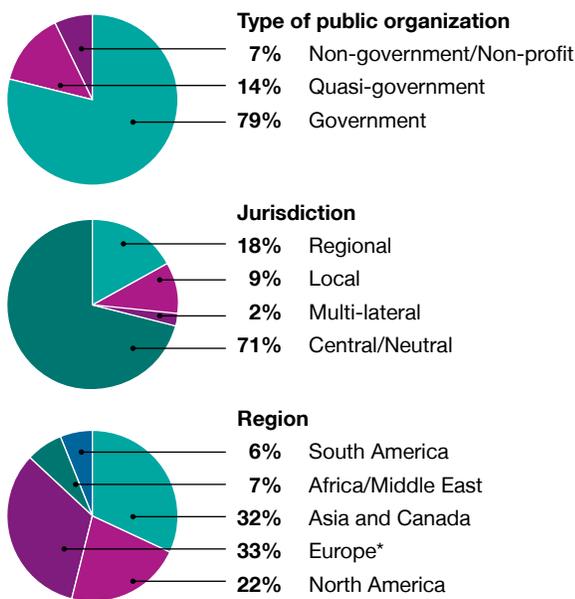
↔ Information explosion and interaction  
 \* For example, political, economic, scientific, social  
 Source: IBM Institute for Business Value.

Figure 9: To build analytics competency, organizations must consider multiple levels of information about issues, outcomes and context.

## Appendix Research methodology

To better understand exactly where organizations are on their path – and to make informed recommendations about where they need to go next – the IBM Institute for Business Value interviewed more than 100 public sector leaders throughout the world, from both advanced and emerging economies.

These interviews encompassed executives from multiple jurisdictions and included governments, non-governmental and non-profit organizations (see Figure 10).



\* Respondents from Europe were from EU member countries.  
Source: IBM Institute for Business Value.

Figure 10: The IBM Institute for Business Value Public Sector Analytics Study featured interviews with more than 100 executives from around the world.

This observational research study is not exhaustive but is aimed to lay the foundation for additional and more detailed research to follow. To focus the interviews on the public sector context (addressing public issues in support of public outcomes), the IBM Institute for Business Value looked through the lens of two public issues and the roles that organizations played relative to those issues:

- **Social protection:** Promoting conditions and the corresponding social support system conducive to social well-being and basic human welfare, particularly protecting society’s most vulnerable.
- **Economic vitality:** Promoting economic well-being and competitiveness through economic and fiscal policies and economic management activities that create a climate for sustainable economic growth and development.

Why these two public issues? Social protection represented one of the highest shares of public expenditures, whereas economic vitality represented those activities that would generate public revenues both directly and indirectly. Either way, the public sector ecosystem is more interrelated than ever before with opportunities for collaboration for common outcomes.

### **Analytics Vision Index (AVI) methodology**

The AVI is a collection of approaches that public sector organizations are taking to build analytics competency. To develop this *a priori* classification index, we explored views on the dimensions of analytics competency – analytics talent, capability and leadership – against a number of questions in the survey that lent themselves to the features of analytics competency.

- Standard scores for each feature were created at the respondent level by deploying a derived weighting scheme that:
  - Took into account the “contribution” of each of the respective variables to overall competency
  - Looked at the standard scores through the available set of (n =30) combinations
  - Assigned an AVI classification based on individual AVI feature combinations.
- In turn, these were “rolled up” qualitatively into four groups based on the intensity (which varies) by which respondents applied these features.
- The AVI was deployed as a parsing variable in statistical efforts (e.g., cross tabulation, means testing).

To learn more about this IBM Institute for Business Value study, please contact us at [iibv@us.ibm.com](mailto:iibv@us.ibm.com). For a full catalog of our research, visit:

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## Related publications

"Analytics: The new path to value." <http://www-935.ibm.com/services/us/gbs/thoughtleadership/ibv-embedding-analytics.html>

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