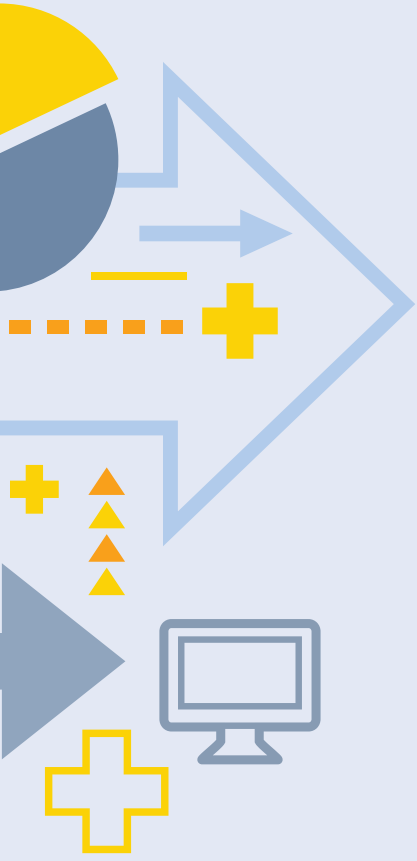
Calling All Government Financial Managers to a More Analytic Role as Highly-Valued Business Advisors!



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"Ninety percent of the world's data has been created in the last two years… The ultimate question is really what insight and value can we draw from that data."[1] The 2012 World Economic Forum[2] declared data an economic asset, like currency or gold. Facing long-term fiscal sustainability shortfalls,[3] government must fully leverage all its assets, including vast untapped data resources.

Connecting the dots and turning data into insight that drives quality decision-making are essential. Powerful analytic capabilities exist today, with ongoing, significant advances in technology and tools. But how do we convert massive raw data into business intelligence?

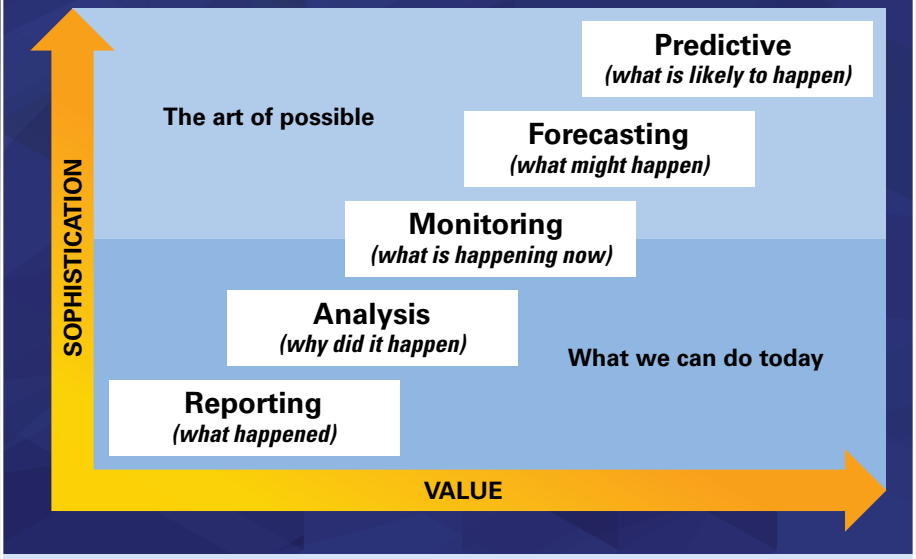
This article explores the challenges of implementing advanced data analytics. We'll look at the emergence of big data and capabilities now available to assist financial managers in assuming a more analytic role as highly-valued business advisors.

What is Big Data and What Does the Future Hold?

Big data represents large volumes of complex data that exceed the capacity of traditional tools for storage, analysis and reporting. It includes structured, semi-structured and unstructured data.[4] It goes far beyond traditional financial information and crosses multiple systems, databases and organizations. Economic implications of data are significant. Research by McKinsey concluded that more open data could lead to $3 trillion of potential annual economic value worldwide across seven domains; with the U.S. accounting for $1.1 trillion.[5]

It's hard to envision the absolute enormity of government-owned data. Data.gov, while in relative infancy, is just one example. Data.gov contains more than 138,000 datasets from all government levels and universities.[6] This information is publicly available for analysis and organized by topic, category, dataset type, tag, format, organization and publisher. Implementation of the Digital Accountability and Transparency Act of 2014 (DATA Act)[7] will significantly

Figure 1. Moving from Reporting "What Happened" to Predicting "What Is Likely to Happen"



increase publicly-available spending information, including data analytic tools on USASpending.gov.[8]

Data analytics are multi-faceted, ranging from straightforward data mining and continuous monitoring for anomalies to predictive analytics. It's not one size fits all, but can be tailored to missions and changing needs. As Figure 1 illustrates, government organizations have opportunities to provide deeper insights into areas that were previously not possible.

While data continue to grow explosively, the primary value driver for the future is the increasing capability to do something with that data.[9] Whereas previously structured data was needed, semi-structured and unstructured data can now be analyzed, and there is a doubling of computing power every 18 to 24 months.[10] Perhaps more important is the advent of powerful algorithms. For example, Harvard University graduate students needed just two hours to develop an algorithm that analyzes data in 20 minutes on a laptop. In the past, this analysis would have required a $2 million computer.[11]

The Gartner Group's "Top 10 Strategic Technology Trends for 2015"[12] envisions a future where:

- "Focus needs to shift to thinking about big questions and answers first and data second."
- "Every app needs to be an analytic app."
- "Analytics will become deeply, but invisibly, embedded everywhere."
- "Embedded intelligence, combined with pervasive analytics, will drive development of intelligent systems that are context-rich. For example, context-aware security applications can adjust security responses and how information is delivered to users."
- "Combining context and deep analytics (such as advanced algorithms), smart machines are on the horizon." Gartner points to a new age of "machine helpers."
- "There will be increased emphasis on serving needs of mobile users in diverse contexts and environments."

How Do Data Analytics Support Cost Management and Program Delivery?

The end game of the Chief Financial Officers (CFO) Act of 1990[13] is managing the cost of government by enabling systematic measurement of performance, development of cost information and integration of systems — program, budget and accounting — so managers have the right information at the right time to make sound spending and operational decisions.[14] High-performing finance organizations move to the boardroom by providing high-quality analytic information.[15] While decision-makers will still use experience and intuition, their decisions become more fact-based, analytic and anticipatory. CFOs who can unlock and place context around data will expand their reach and create greater value,[16] and agencies will greatly benefit from increased business intelligence (BI).

It's essential to choose the right data to uncover the right insights. The right BI platform can provide ready-to-go intelligence. Let's go over two common types of BI.

System generated reports, such as purchase credit card statements, are commonplace. In a standardized format, purchase card statements detail the charges for the reporting period and list vendors, dates and brief descriptions of charges. This highly-structured report makes it easy to distribute the same types of information to all users, but offers little flexibility or capacity for self-authoring.

Impromptu reporting and advanced data visualization are used for customized data views. Let's assume users want to know how often they buy certain products from a vendor and the average cost per item. With advanced data visualization, purchase data could be organized spatially and compared to the prices of competing vendors in the area. By introducing time dimensions to the analysis, users can also determine the most economical time for making a purchase.

By providing BI, CFOs can add greater value through:[17]

- Informing day-to-day decision-making
- Providing predictive intelligence and trend analysis
- Supporting mission performance
- Strengthening governance capabilities
- Enhancing oversight and transparency
- Pinpointing anomalies to prevent and detect fraud, waste and abuse
- Targeting areas of highest value or risk for increased scrutiny
- Reducing costs, including areas representing lower risk
- Improving operating performance and efficiency
- Staying in front of issues
- Shifting the audit paradigm by having management use common audit tools to identify and address anomalies; after all, management owns the data auditors audit[18]

A 2010 MIT Sloan Management Review study of business analytics, which included a survey of 3,000 executives and analysts, found that leading organizations:

> "…. put analytics to use in the widest possible range of decisions, large and small. They are twice as likely to use analytics to guide future strategies, and twice as likely to use insights to guide day-to-day decisions. They make decisions based on rigorous analysis at more than twice the rate of lower performers and as such have the greatest opportunity of meeting their goals."[19]

And it goes far beyond financial data. From the World Economic Forum:

> "A flood of data is created every day by the interactions of billions of people using computers, GPS devices, cell phones, and medical devices... Researchers and policymakers are beginning to realize the potential for channeling these torrents of data into actionable information."[20]

Analytics Are Not New to Government

Data analytics already play an important role in government. In some areas, government leads, such as in the development of high-powered analytic approaches by the intelligence, defense and homeland security communities to protect the U.S. from domestic and foreign threats.

Agencies routinely use analytics to manage programs and control costs, such as the U.S. Navy's use of analytic tools to reduce flight costs;[21] the U.S. Coast Guard's development of a business intelligence system to gauge mission readiness;[22] and a model used by the Social Security Administration that allows continuing disability payments to be processed in less than one second.[23] In another example, mobile data patterns were used in support of government and humanitarian organizations to understand and accurately analyze the destination of over 600,000 displaced Haitians following the devastating 2010 earthquake.[24]

Current examples in the financial manager's wheelhouse:

- Analytic tools have been essential to avoiding a reported $93 billion in improper payments and recovering an additional $26 billion for fiscal years 2010 to 2013.[25]
- The Department of Interior has been turning its financial data into information in easy-to-read formats, which provides meaningful performance dashboards and allows users to drill-down several levels and dimensionally monitor results.
- The use of personal identification verification card activity, in combination with other datasets, can unlock endless possibilities for curtailing fraud, waste and abuse. For example, employees receiving transit benefits can be matched against parking garage entrances, and time and attendance records can be matched against building access or network login activity. Office space usage therefore can be maximized and building footprints reduced.

- Data analytics can enable CFOs to analyze 100 percent of general ledger and transaction-level data for management information, including obligation and spending trends, component benchmarking, transaction anomalies and consistency and timeliness while applying internal accounting processes.
- Through leveraging the power of a data warehouse, CFOs can streamline preparation of documents to meet information requests, such as by Congress and auditors.
- Financial managers can greatly benefit from the experiences of and lessons learned by government auditors. For decades, auditors have extensively used analytics in financial statement audits, as well as in program audits and investigations as a window for identifying fraud, waste and abuse.[26] Today these auditors are modernizing financial statement auditing through digital auditing.[27]

Government and the Private Sector Face Challenges in Expanding Data Analytics

While a litany of examples exist of government effectively using data analytics, the journey has just begun. Government is grappling with expanding its data analytics footprint. AGA's research into "Leveraging Data Analytics in Federal Organizations," which surveyed federal CFOs and inspectors general, found that:[28]

- 67% have implemented data analytics to improve decision-making.
- Of the 33% responding that they had not implemented data analytics, 67% cited lack of resources, 53% lack of appropriate staff and 34% lack of know-how.
- 91% viewed agency leaders as having a general understanding of data analytics, but only 23% rated leadership support as high.
- 18% rated workforce skills in data analytics as high.
- 8% have fully integrated data analytics into management, budgeting and planning.
- 46% cited inconsistent use.
- 46% said data analytic processes are in management silos, with little consistency or standardization in approaches.

Government is not alone in facing challenges to greater use of data analytics. Let's look at key findings of a survey of 144 CFOs and chief information officers in major corporations worldwide.[29]

- 69% consider data and analytics crucial to growth.
- 56% changed their business strategy to meet the challenges of big data.
- 42% consider integrating data technology into existing systems and/or business models to be the biggest challenge regarding data capture.
- 85% said their biggest challenges include implementing the right solutions to accurately analyze and interpret data.
- 75% expressed some level of difficulty in making decisions around analyzing data.
- Identifying what data to collect was cited as the biggest barrier to data analytics.
- To varying extents, 96% agree they could better utilize data analytics.

What Are the Next Steps for Government Financial Managers?

Here are 10 steps to consider in implementing a data analytics program.[30]

1. **Accept responsibility and obtain top management sponsorship.** If there's a void, don't wait for others to step-up. Seek a clear mandate for what will quickly become transformative change. Place data analytics on top management's radar screen, so it's something they truly care about and strongly support.
2. **Know what questions need to be answered.** Start with questions and not data.[31] Understand the magnitude and nature of agency management's information needs and available data to support those needs. Establish how information will be used in decision-making and asset safeguarding. Broadened data visibility helps connect the dots, so data become useful management information.
3. **Understand the full range of available advanced analytic capabilities.** Don't just buy a tool and call it a day. Data analytics tools must be the best fit for your needs. Talk to stakeholders. Participate in user groups. Leverage your auditor's extensive experience with data analytics. They've successfully used analytics tools for decades. While auditors cannot carry out management functions or make management decisions under Government Auditing Standards, they can provide general advice, such as insights on leading practices.[32]
4. **Perform a comprehensive gap analysis to identify data strengths and weaknesses.** Benchmark against leading practices. Understand your data and where they reside. Catalog information pathways and barriers, including system, organization and mission boundaries and privacy and other laws. Understand information that comes from other organizations, including third parties. Obtain stakeholder input.

5. **Define your transformation strategy and obtain stakeholder buy-in.** Establish goals, objectives, action steps, timelines, resource needs and performance metrics. Transformational change takes time and attention to detail and must be anchored in a well-understood, broadly-supported strategy. Start small and build from initial successes. Avoid stove-piped solutions that are not well-coordinated and that can lead to suboptimal results. And again, work closely with stakeholders as partners.
6. **Get the right data and get it right.** Data relevance and quality drive success. "Garbage-in" remains "garbage-out." Take a page from auditors and study the composition and structure of the data, its underlying quality, and how it can be best accessed and analyzed through analytic tools.
7. **Begin with lower-hanging fruit.** Don't boil the ocean on day one. Keep building capacity, even though it will take time, perseverance, trial and error. Look for early successes to encourage and motivate the organization. Even if small steps are taken initially, ensure data and analytic quality before engaging users. First impressions can be lasting.
8. **Keep your finger on the pulse.** Develop benchmarks and dashboards to drive performance and accountability. Measurable goals should align with priorities and be results-oriented. Goals must be realistic yet challenging, and consider organizational span of control. Unrealistic or impractical goals will remain so, whether or not they are part of managers' performance goals. Focus on results. Are data being turned into information that adds value in managing the agency? Are data analytic outputs embedded into day-to-day business processes and decision-making?[33]
9. **Constantly reevaluate and challenge the status quo.** This is not one and done. Components of the program must work together for optimum success. If one component changes or new leading practices emerge, it's important to evaluate the impact on other components. And don't be afraid to try new things.
10. **View this as change management.** Change management prepares organizations and employees to navigate the change process and sustain transformation initiatives. The goal is to optimize the collective ability and willingness to adopt sustainable change, while proactively mitigating resistance, thereby driving accelerated, measurable results. Change management includes technical, process, and procedural elements and issues impacting deeply-rooted organizational cultures and employee roles and responsibilities. Building a highly-analytic CFO workforce, which the aforementioned AGA research[34] found not yet to be in place, is paramount. Put the

talent quest on the front burner. Team data scientists, who can apply leading-edge tools while thinking outside-the-box, with program experts, who — as the ultimate users — provide context sophistication related to data needs. As with any transformation, top leadership must personally own and drive change. Finally, communication, communication, communication and more communication is essential to engage employees and stakeholders and achieve needed understanding and buy-in across the organization.

Final Thoughts

Let's answer the call to connect the dots and turn untapped data resources into sophisticated insight that drives more effective, efficient government and enables financial managers to add much greater value.

Take full advantage of continuing rapid advances in technology and analytic capabilities and the advent of enterprise resource systems to provide a new window to information for decision-makers. Supported by a clear game plan, form partnerships with program managers to exploit today's opportunities to turn data into information assets. This will help move CFOs to the boardroom in a more analytic role as highly-valued business advisors and greatly benefit government.

Endnotes

1. "The Big Data Phenomenon," by George Lee, Goldman Sachs, September 2014.

2. Founded in 1971 as an independent non-profit foundation, the World Economic Forum works to improve the state of the world through public-private cooperation. Its members comprise 1,000 of the world's top corporations. The World Economic Forum engages political, business, academic and other leaders of society "to define challenges, solutions, and actions, always in the spirit of global citizenship."

3. "Establishing Long-Term Fiscal Sustainability: Daunting Choices and Shared Sacrifice," by William R. Phillips, MBA, CGFM and Jeffrey C. Steinhoff, CGFM, CPA, CFE, CGMA, Journal of Government Financial Management, fall 2012.

4. Data are collections of information that take on a variety of forms. Each form contains useful facts for analysis and presents unique challenges to process, manage, and analyze. Structured data are information structured and organized into rows and columns (such as in payment, timekeeping and inventory systems). Semi-structured data are also structured but not organized into rows and columns (such as EDI, text reporting and XML). Unstructured data are information not organized in rows and columns (such as email, paper documentation and written material).

5. "Open data: Unlocking innovation and performance with liquid information," by James Manyika, Michael Chui, Peter Groves, Diana Farrell, Steve Van Kuiken, and Elizabeth Almasi Doshi, McKinsey Global Institute, McKinsey Center for Government and McKinsey Business Technology Office, October 2013.

6. Data.gov is the home of the U.S. Government's open data, where "you can find federal, state and local data, tools, and resources to conduct research, build apps, design data visualizations and more."

7. Public Law 113-01, May 9, 2014.

8. "Are You Prepared to Meet the Challenges of the DATA Act and Open the Door Wider on Government Spending?," by Jeffrey C. Steinhoff, CGFM, CPA, CFE, CGMA; Andrew C. Lewis, CGFM, CPA, CIPP/G; and Kyle D. Brown, CGFM, CPA, Journal of Government Financial Management, spring 2015.

9. "Why "Big Data" is a Big Deal," by Jonathan Shaw, Harvard Magazine, March-April 2014.

10. Moore's Law (named for Gordon E. Moore, co-founder of the Intel Corporation) is a widely-accepted observation introduced by Moore in 1965 that computer processor speeds, or overall processing power, will double every two years (http://www.mooreslaw.org/). The timeline is sometimes referred to as 18 months, so we used 18 to 24 months in the article.

11. See Endnote 9.

12. Released on October 8, 2014, the Gartner Group's 10 strategic technology trends for 2015 are (1) computing everywhere, (2) the internet of things, (3) 3D printing, (4) advanced, pervasive and invisible analytics, (5) context-rich systems, (6) smart machines, (7) cloud/client reporting, (8) software defined application and infrastructure, (9) web-scale IT, and (10) risk-based security and self-protection.

13. Public Law 101-576, 104 Stat. 2838, November 15, 1990.

14. "The CFO Act Turns 20 Years Old: As We Blow Out the Candles, Where Are We Today and Where Do We Go From Here," by Jeffrey C. Steinhoff, CGFM, CPA, CFE; and John R. Cherbini, MBA, CGFM, CPA, Journal of Government Financial Management, winter 2010.

15. "KPMG Executive Guide to High Performance in Federal Financial Management," KPMG Government Institute, June 2009.

16. Ibid.

17. "Governing to Win, Chapter Twelve: Strategically Use Business Analytics," by Jeffrey C. Steinhoff, IBM Center for the Business of Government, April 2012.

18. "Forensic Auditing — A Window to Identifying and Combating Fraud, Waste and Abuse," by Jeffrey C. Steinhoff, CGFM, CPA, CFE, Journal of Government Financial Management, summer 2008.

19. "Analytics: The New Path to Value," by Steve LaValle, Michael Hopkins, Rebecca Shockley and Nina Krushwitz, MIT Sloan Management Review, in collaboration with the IBM Institute for Business, October 2010.

20. "Personal Data: The Emergence of a New Asset Class," World Economic Forum, January 2011.

21. "Data to Decisions: The Power of Analytics," Partnership for Public Service, November 2011.

22. Ibid.

23. "One Trillion Reasons," Technology CEO Council, www.techceocouncil.org

24. "Big Data, Big Impact: New Possibilities for International Development," World Economic Forum, 2012.

25. www.paymentaccuracy.gov, as of March 2015, covering fiscal years 2010 to 2013; "Are You Combat Ready to Win the War Against Improper Payments, by Danny Werfel, JD, MPP; and Jeffrey C. Steinhoff, CGFM, CPA, CFE, CGMA, Journal of Government Financial Management, summer 2014; and "High-performing state Medicaid integrity programs: Putting it all together in the "Final Mile"," KPMG Government Institute, November 4, 2014.

26. "Auditors and Investigators Using Data Analytics to Accomplish Their Mission," Inspectors General the Honorable Kathy Tighe, David A. Montoya and David Williams, and Dr. Timothy Persons, AGA Web Conference, January 14, 2015; and "Forensic Auditing — A Window to Identifying and Combating Fraud, Waste and Abuse," by Jeffrey C. Steinhoff, CGFM, CPA, CFE, Journal of Government Financial Management, summer 2008.

27. "Digital Auditing: Modernizing the Government Financial Statement Audit Approach," by Andrew C. Lewis, CGFM, CPA, CIPP/G, Corbin Neiberline, CGFM, CPA, and Jeffrey C. Steinhoff, CGFM, CPA, CFE, CGMA, Journal of Government Financial Management, spring 2014.

28. "Leveraging Data Analytics in Federal Organizations," by Helena G. Sims, and Steven E. Sossei, CPA, AGA Corporate Partner Advisory Group, Research Series Report No. 30, May 2012.

29. "Going beyond data: Achieving actionable insights with data and analytics," KPMG Capital, March 29, 2014.

30. "Smart Use of Data Mining is Good Business and Good Government," by Jeffrey C. Steinhoff, CGFM, CPA, CFE and Terry L. Carnahan, CGFM, CPA, Journal of Government Financial Management, spring 2012.

31. "Analytics: The New Path to Value," by Steve LaValle, Michael Hopkins, Rebecca Shockley and Nina Krushwitz, MIT Sloan Management Review, in collaboration with the IBM Institute for Business, October 2010.

32. Government Auditing Standards: 2011 Revision, GAO-12-331G, December 2011.

33. See Endnote 31.

34. See Endnote 28.

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