



The Association of
Accountants and
Financial Professionals
in Business

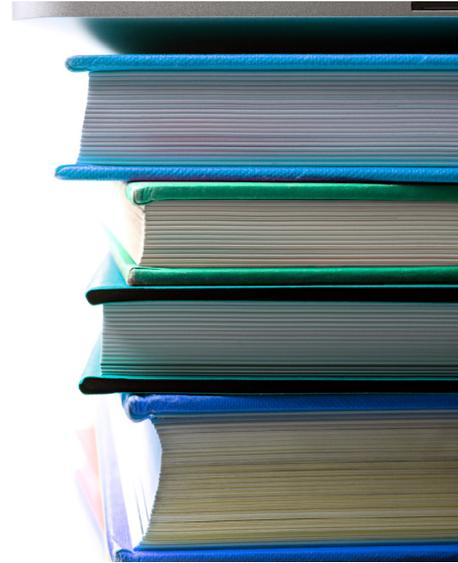


The Impact of Big Data on Finance Now and in the Future

About IMA® (Institute of Management Accountants)

IMA, named the 2017 and 2018 Professional Body of the Year by *The Accountant/International Accounting Bulletin*, is one of the largest and most respected associations focused exclusively on advancing the management accounting profession. Globally, IMA supports the profession through research, the CMA® (Certified Management Accountant) and CSCA® (Certified in Strategy and Competitive Analysis) programs, continuing education, networking, and advocacy of the highest ethical business practices. IMA has a global network of more than 125,000 members in

150 countries and 300 professional and student chapters. Headquartered in Montvale, N.J., USA, IMA provides localized services through its four global regions: The Americas, Asia/Pacific, Europe, and Middle East/India. For more information about IMA, please visit www.imanet.org.



About the Authors

Raef Lawson, Ph.D., CMA, CSCA, CPA, CFA, CAE, is professor-in-residence and vice president of research and policy at IMA. You can reach him at (201) 474-1532 or rlawson@imanet.org.

Toby Hatch is a senior product marketing director for enterprise performance management with Oracle Corporation. You can reach her at toby.hatch@oracle.com.

Denis Desroches, an enterprise performance management specialist since 1993, has supported organizations with the selection, implementation, and knowledge acquisition of scorecard, performance management, and activity-based management solutions. He can be contacted at desroches.associates@sympatico.ca.



Executive Summary

As more organizations take a data-centric approach to managing their business, they are increasingly exploiting the potential of Big Data. The number of companies deploying Big Data will double in the near future, exceeding the implementation rate of other “hot” technologies such as data visualization and process automation. Yet the implementation of Big Data remains a work in progress for most organizations, with most having started but very few having completed implementation. But the rewards are there to be had: Organizations that have implemented strategies around Big Data are reporting significant improvement in their organizational performance.

Getting Big Data implementation “right” involves paying attention to several key items, including:

- Starting simple and small when first implementing Big Data projects.
- Expanding the sources of data used and exploring potential uses not only of data available internally but also of data available externally.
- Getting information based on data into the hands of those who need it on a real-time basis.
- Getting buy-in for Big Data and leading-edge analytics initiatives at both the executive and departmental levels.
- Developing strategies for the effective use of leading-edge analytics techniques and technologies.
- Building strong data governance and quality infrastructure in order to ensure data integrity and quality.

Organizations that have implemented strategies around Big Data are reporting significant improvement in their organizational performance.

The increased emphasis on data provides an opportunity for finance and accounting professionals—who traditionally are proficient at pulling data from a variety of information systems, manipulating that data, and gleaning insights from it—to build on this core competency and assume a business partnering role with others in their organizations. However, in order to exploit this opportunity, they will need to develop new skills.





Introduction

Four key elements must be present for organizations looking to become data-driven: data-savvy people, quality data, state-of-the-art tools, and a supportive organizational culture.¹ In previous reports, we've examined the implementation of leading-edge analytics in organizations today and identified key factors for successfully establishing a data-driven organizational culture.² We now shift our focus to data—especially Big Data.

Our findings are based on a survey conducted by IMA[®] (Institute of Management Accountants) that received 170 responses (121 from IMA members; the balance from direct mail and social media solicitations). Results presented here are based on the responses to that survey.

Impact of Technology and Data

The business environment is increasingly competitive, and most organizations are looking for an “edge.” For many companies, that “edge” is the implementation of new technology, enabling the mining of vast amounts of data (Big Data) using leading-edge analytical tools.

China Eastern Airlines Corporation Ltd. (CEA) is one of China's three major airlines and ranks number seven in the world. As a member of the global airline network SkyTeam Alliance, it services over 100 million passengers annually and reaches 1,062 destinations in 177 countries.

To enhance customer experience and drive global airline excellence, CEA wanted to improve the ability to process and analyze massive volume [sic] of big data from its data lab, to ensure flight safety and reduce operational costs.

“By processing and analyzing over 100TB of complex daily flight data ... we gained ability [sic] to easily identify and predict potential faults and enhanced flight safety. The solution also helped to cut fuel consumption and increase customer experience.”

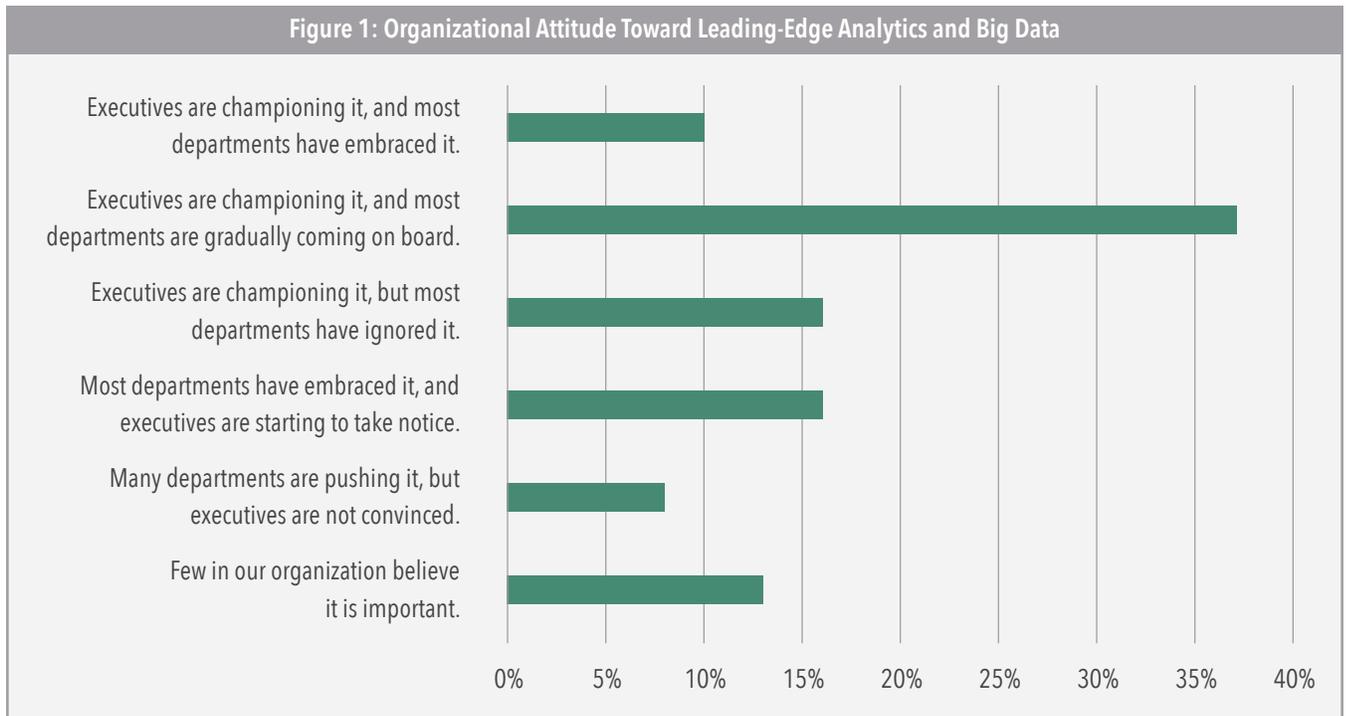
—Wang Xuewu, Head of Data Lab, China Eastern Airlines Corporation Ltd.³

The perceived importance of Big Data and analytics is underscored by the fact that the drive to implement these technologies and tools is coming from the top of organizations—in nearly two-thirds of companies, executives are championing the initiative (see Figure 1).

¹ Rasmus Wegener and Velu Sinha, “The value of Big Data: How analytics differentiates winners,” Bain & Company, Inc., September 17, 2013, bit.ly/2JmfQCI.

² Raef Lawson, Toby Hatch, and Denis Desroches, “The Data Analytics Implementation Journey in Business and Finance,” IMA, January 2019, bit.ly/2pXlenB; Raef Lawson, Toby Hatch, and Denis Desroches, “How to Embrace Data Analytics to Be Successful,” IMA, February 2019, bit.ly/2M5Bz16.

³ “China Eastern Airlines Adopts Oracle Big Data to Enhance Flight Safety,” Oracle, bit.ly/2Wgkd7j.



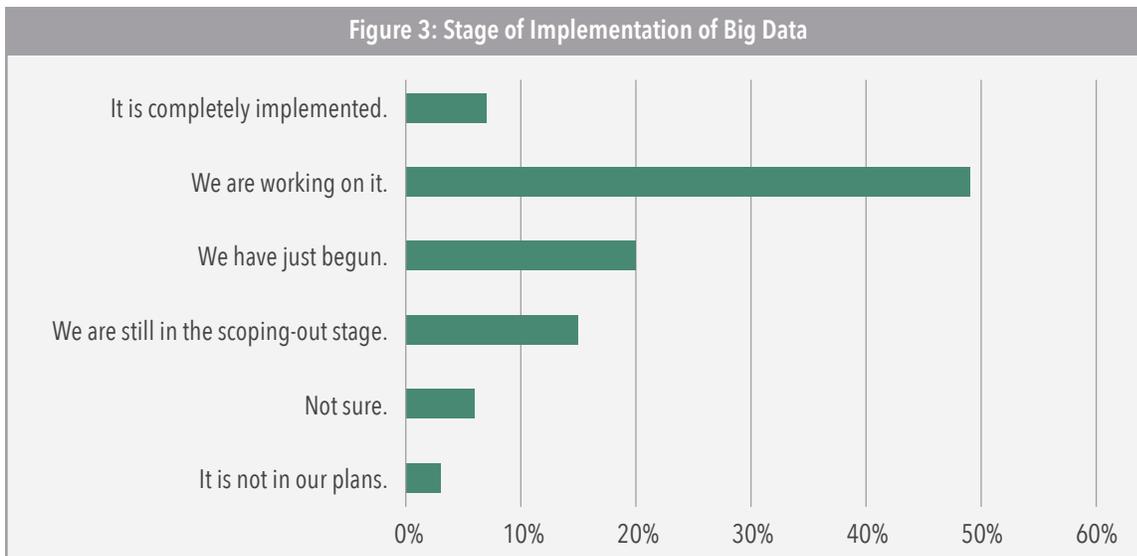
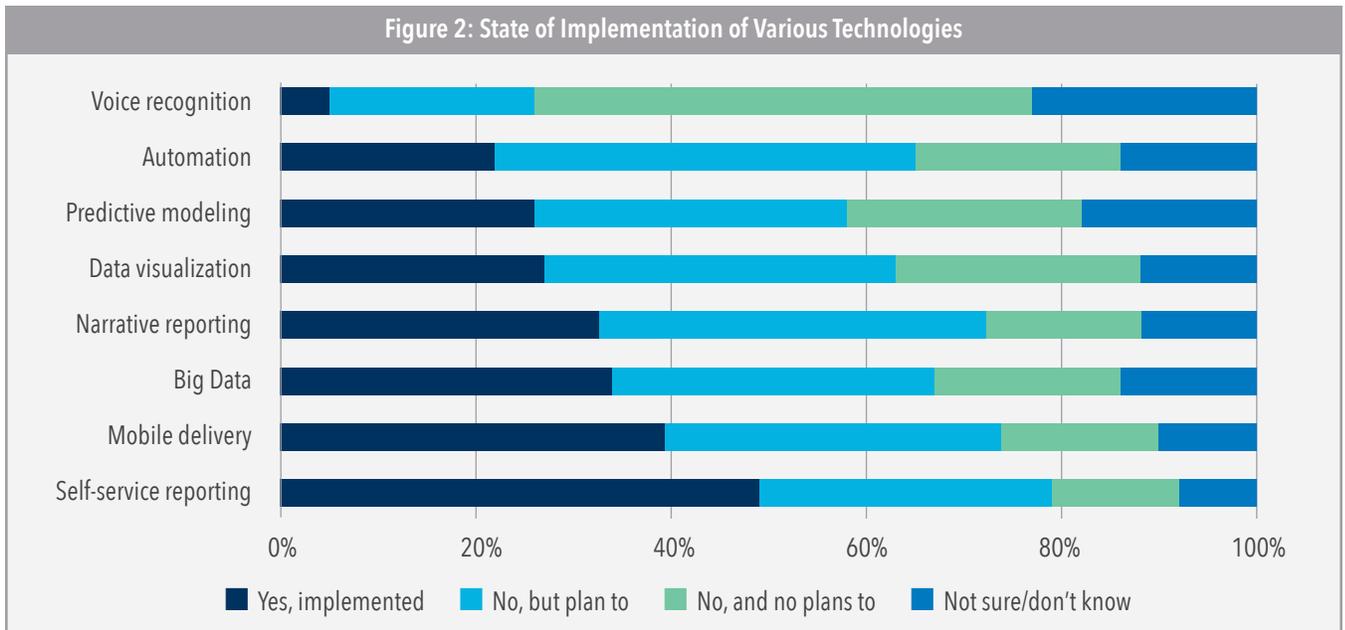
While some technologies, such as robotic process automation (RPA), are enabling finance operations to become more efficient, others are enabling it to provide greater strategic and operational insights. These insights are being obtained using leading-edge analytics on an expanding set of data. The shift in the use and importance of data is borne out by a recent IMA survey that found that almost half (45%) of the respondents indicated their company now takes a “strong” or “very strong” data-centric approach to information technology.⁴

Big Data

While organizations can implement new technologies and employ leading-edge analytics, they may be still deploying these on relatively traditional sets of data. To what extent are companies exploiting the ability to analyze vastly larger, more complex data sets—Big Data? The answer is to a fairly large extent, with much more soon to come. Of the technologies listed in Figure 2, the implementation rate of Big Data is only exceeded by self-service reporting and mobile delivery and exceeds “hot” applications such as data visualization and process automation. Equally indicative of the perceived importance of Big Data is the fact that the percentage of companies exploiting Big Data is expected to double in the relatively near future.

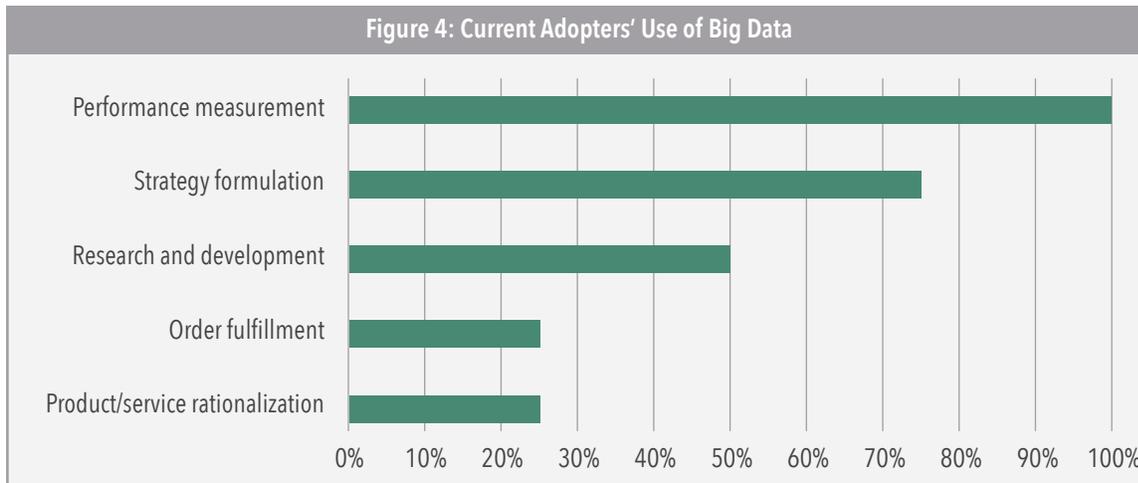
As with other technologies, the mining of Big Data is a work in progress for most organizations (see Figure 3). Very few have completed implementation, but most have started and are on the road to gleaning additional important business insights from their data.

⁴ Kip Krumwiede, “How to Keep Your Job,” IMA Pulse blog, September 21, 2017, bit.ly/2phN3bB.



Uses of Big Data

While Big Data can be used to positively impact processes throughout an organization, its potential impact is greater for some processes than others. Key among those with the greatest benefit is performance measurement. Organizations face significant challenges in objectively evaluating the performance of their employees, processes, machinery, and so forth. Deploying Big Data capabilities to collect and evaluate the mountain of data needed to make these evaluations “makes sense” for many organizations. All the companies in our study deploying Big Data capabilities are using it as part of their performance evaluation process (see Figure 4).



Strategy formulation and implementation is another important process for which organizations are deploying Big Data capabilities. More than half of the organizations in our study currently employing Big Data are using it for this purpose. This makes sense as incorporating such data in the formulation of their strategies will lead to a more robust process and deliver competitive advantage.

While implementation of Big Data techniques is an ongoing effort at most companies, benefits in key areas such as performance measurement and strategy formulation are already being achieved. Based on these early successes, they are employing the use of Big Data in other organizational processes as well, with more applications to follow.

Mobile operators are taking their data one step further, sharing smartphone GPS data with banks to help them monitor and prevent credit card fraud by verifying a person's card use against their location. This is also reduces [sic] the need for credit card freezes, so customers who are on holiday or working abroad don't have to deal with the frustration and time loss of contacting their bank.⁵



⁵ William Trotman, "3 Big Data Analytics Use Cases Against Fraud," Oracle Big Data Blog, August 7, 2017, bit.ly/2PjuvCn.

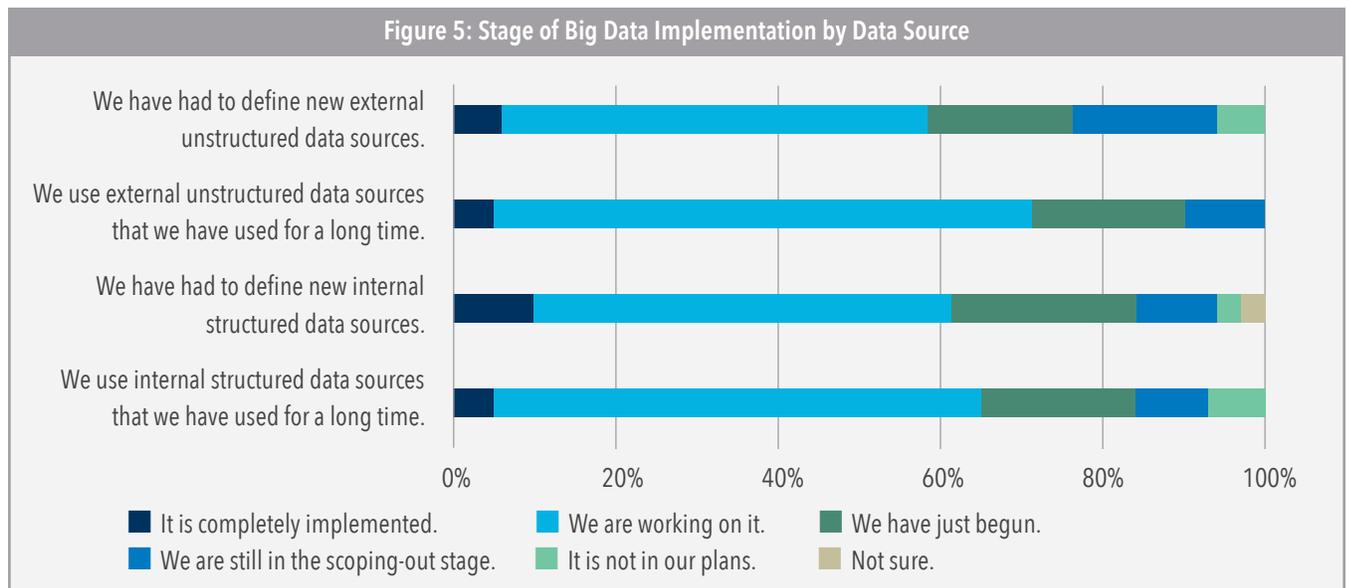


Big Data Implementation—Getting it Right

Like any organizational change initiative, getting Big Data implementation “right” involves paying attention to several key items. One of these is deciding where to start with Big Data. Organizations may have quite a bit of data but can struggle identifying which of it is useful. In such cases, many experts advise framing useful business questions and focusing the analysis on answering those questions.

Another important consideration is the scope of initial implementation. Often the best way to embark on the Big Data journey is to start small, harvesting “low-hanging fruit” from such projects. By choosing a relatively small, simple example and achieving success, the benefits of Big Data adoption will be clearly demonstrated, facilitating additional, more impactful adoptions. Working with business partners in other functional areas to identify those projects that are more important and impactful is key here.

Consistent with the idea of starting simple and small when implementing Big Data projects, we find companies are more likely to use existing data sources when starting their Big Data journey, although both existing and new data sources are being used (see Figure 5).



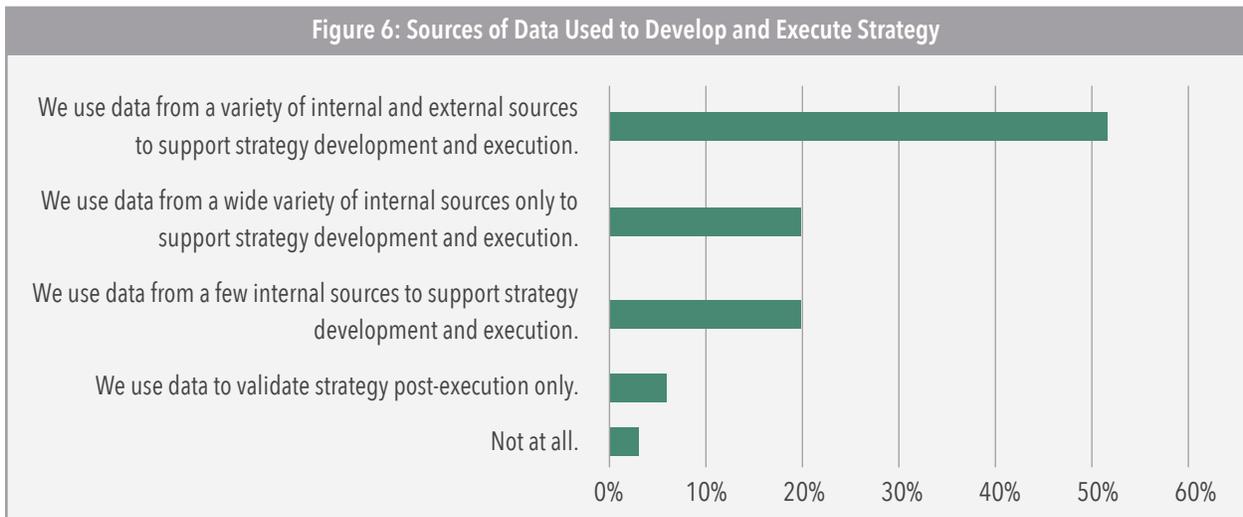
The increased emphasis on data provides an opportunity for finance and accounting professionals—who traditionally are proficient at pulling data from a variety of information systems, manipulating that data, and gleaning insights from it—to build on this core competency. The challenge now is to expand the sources of data used and to explore potential uses not only of data available internally but also of data available externally.

Companies like Turkcell analyze billions of daily call data records alongside other customer data to build more complete user profiles. By comparing a customer’s recent activities with this highly detailed profile, Turkcell can detect irregularities more effectively and quickly.

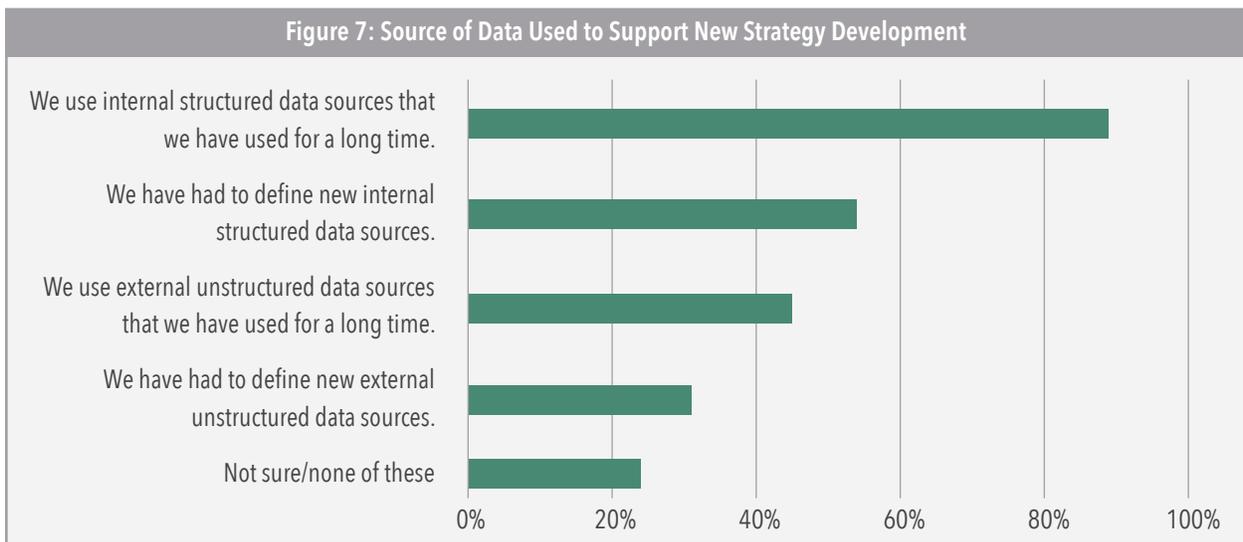


For example, many people who conduct subscription fraud tend to not pay their bills and exhibit suspicious long-distance calling patterns in the six months following an installation. Anomalous behaviors like these can inform predictive models and make the entire business better equipped to block criminal accounts.⁶

The majority of organizations today understand the importance of using data from new and varied sources and consider both internal and external data when developing and executing their strategy (see Figure 6).



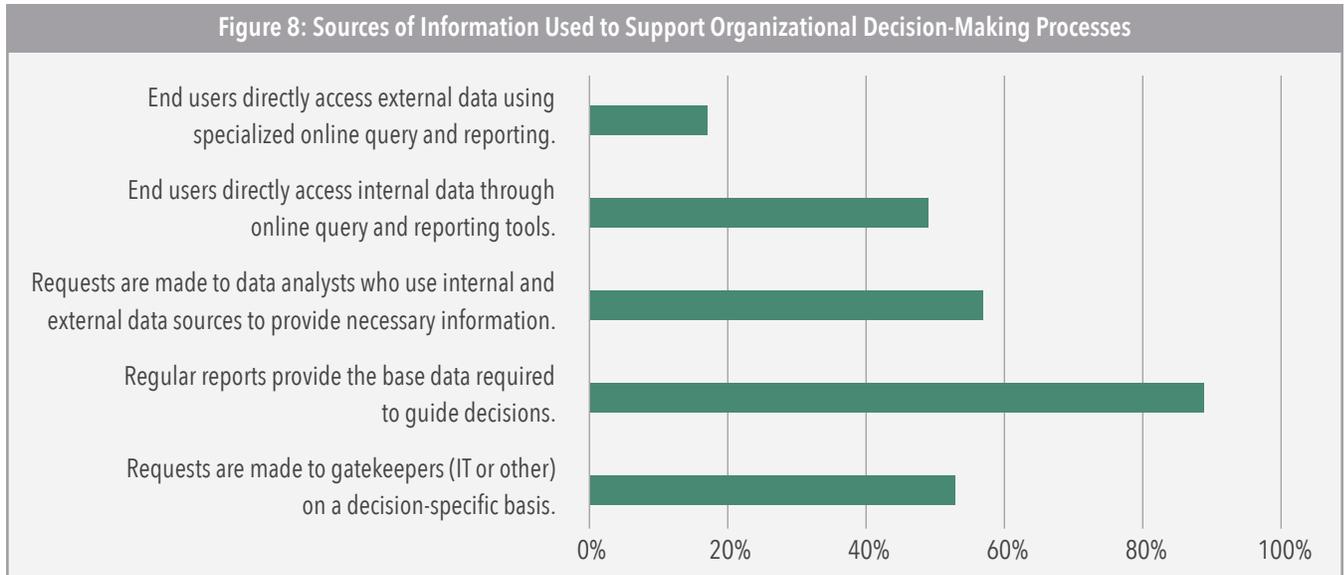
Yet much remains to be done in this regard, as many organizations continue to rely heavily on preexisting internal data structures and relatively few currently employ new external unstructured data sources (see Figure 7). Exploiting the various rich sources of data available remains very much a work in progress for most companies.



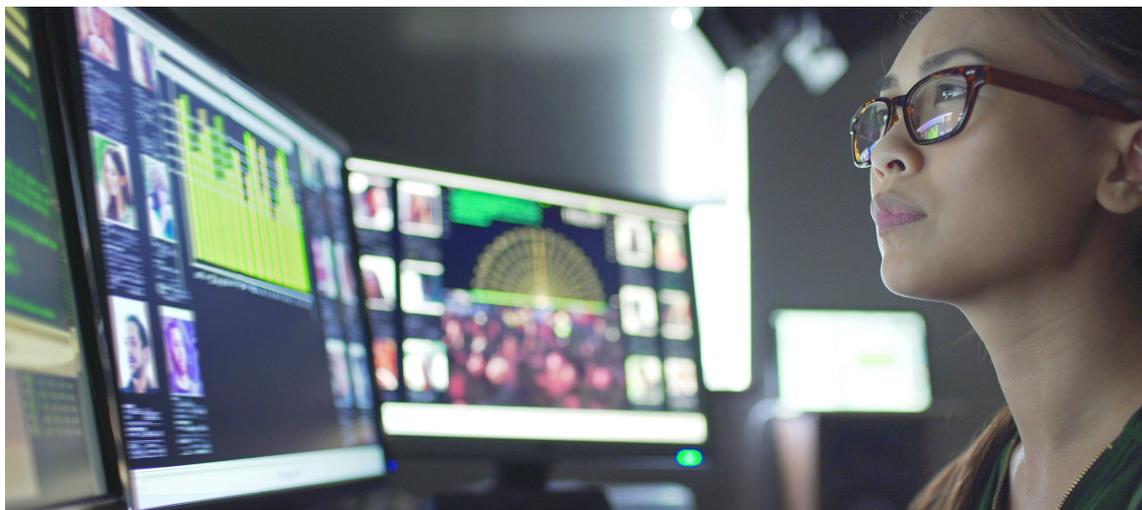
⁶ Trotman, 2017.

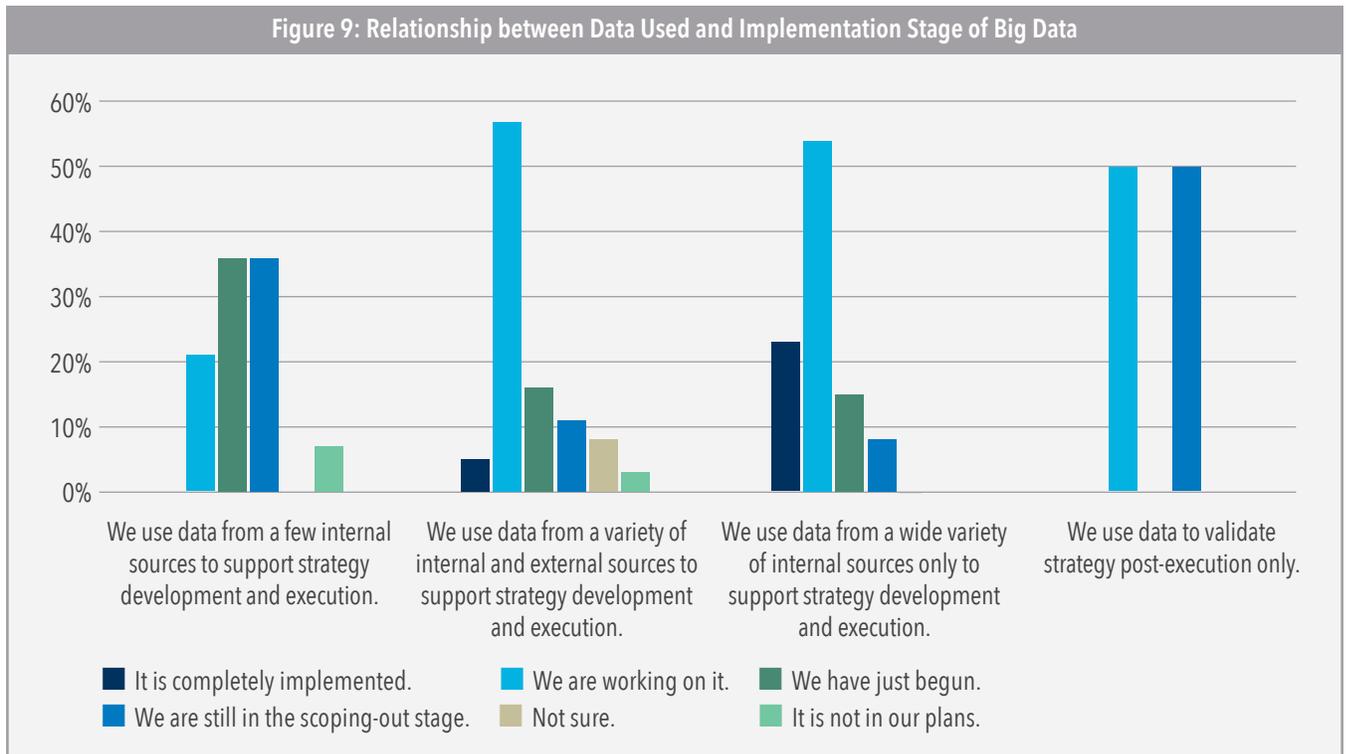


An additional challenge is getting information based on data into the hands of those who need it. While self-service reporting is now being increasingly adopted, at the present time data is most often presented in predefined reports (see Figure 8). While this mode of data transmittal might have been sufficient in the past, it is not sufficient now to meet the needs of organizations that want to be data-driven and more responsive to their changing environment and customers' needs.



When it comes to deploying Big Data in strategy development and execution, the stage of implementation is affected by the source of data used. As might be expected, organizations that only use internal data sources tend to be the furthest along in implementation. Organizations using both internal and external data are further behind, due to the need to identify, collect, and validate that data. Furthermore, organizations that are not using data to inform their operations, that only use data post-execution, also tend to lag, reflecting the lack of importance attributed to being data-driven. (See Figure 9.)

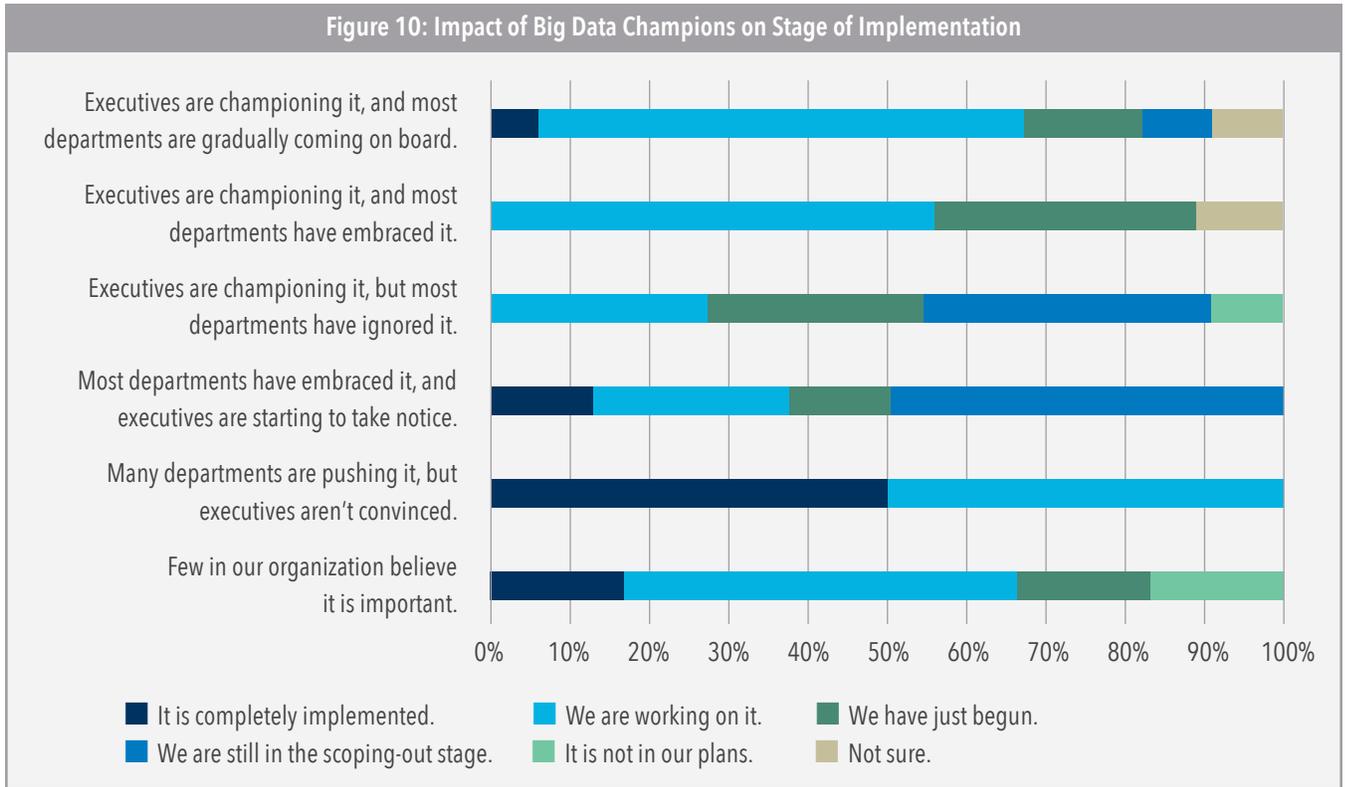




An essential factor for establishing a data-driven organizational culture employing Big Data is having strategies for the effective use of leading-edge analytic techniques and technologies. It's not enough to just buy leading-edge technology for Big Data and analytics. To be a truly data-driven organization, strategies must be in place to ensure everyone is trained on the technology, uses it appropriately, understands and reports results based on it, and, most importantly, executives and employees are committed to act on insights uncovered based on the data. Without having these strategies in place, purchasing the technology is a waste of money. Even worse, if employees using the technology uncover insights for improvements, but these insights are ignored by management (which is not prepared for change), it can have a negative and deflating effect on the morale and motivation of employees.

Slightly more organizations have developed strategies around the use of Big Data (53%) vs. those that have not (43%). If organizations are to realize the potential of Big Data, much remains to be done in this regard. The 4% of respondents indicating "Other" when asked about developing these strategies reinforce the idea that this is an evolving area. They provided such comments as "We plan to revisit this in our annual company meeting", "Somewhat—working on a more consistent process", and "Our parent group has a strategy around Big Data analytics; this will percolate to other associate companies."

While the number of survey respondents that have already implemented strategies around Big Data was relatively small, its impact is clear: The vast majority (80%) report improvement in their organizational performance, with the remaining organizations indicating it was too early to tell if benefits had been achieved.

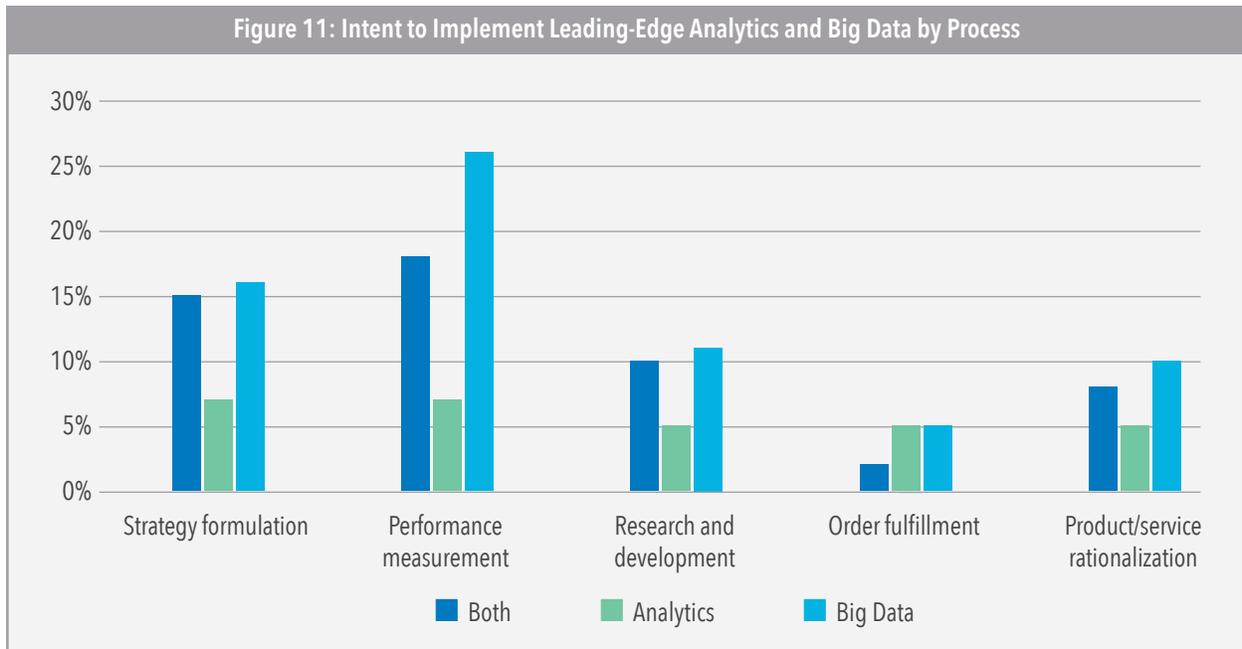


Big Data and Analytics

In our earlier reports, we noted that most organizations expected to achieve benefits in performance measurement and strategy formulation by implementing leading-edge analytics. The combination of leading-edge analytics and Big Data can significantly increase the potential of both these tools to add value to an organization, providing opportunities for businesses to gain greater insight into their operations and improve their forecasts. Organizations that do not want to be left behind by their competition need to ensure that they are devoting sufficient resources to deploying enhanced analytic technologies and Big Data.

An interesting question is how the use of Big Data relates to the implementation of leading-edge analytics. One might hypothesize that—especially among small and medium-sized enterprises (SMEs)—the implementation of leading-edge analytics would come first. This is not usually the case. Most organizations are at the same stage in implementing both tools, with about the same number further along in implementing leading-edge analytics as in implementing Big Data.

A different picture emerges when we look at the long-run intent of organizations to implement Big Data. In that case, for nearly every business process, more organizations are planning on implementing Big Data capabilities than leading-edge analytics. (See Figure 11.)



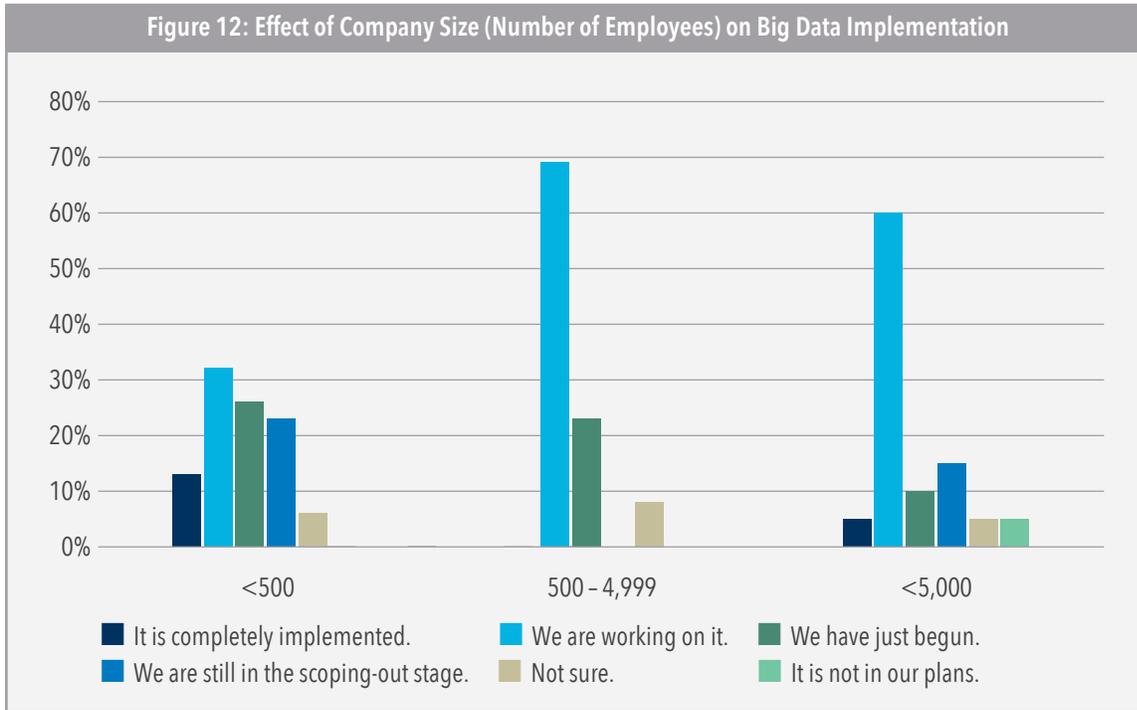
The difference in expected utilization between processes can be attributed to the extent to which they utilize routine activities and the extent to which mining Big Data can provide useful insights in the process.

Impact of Company Size

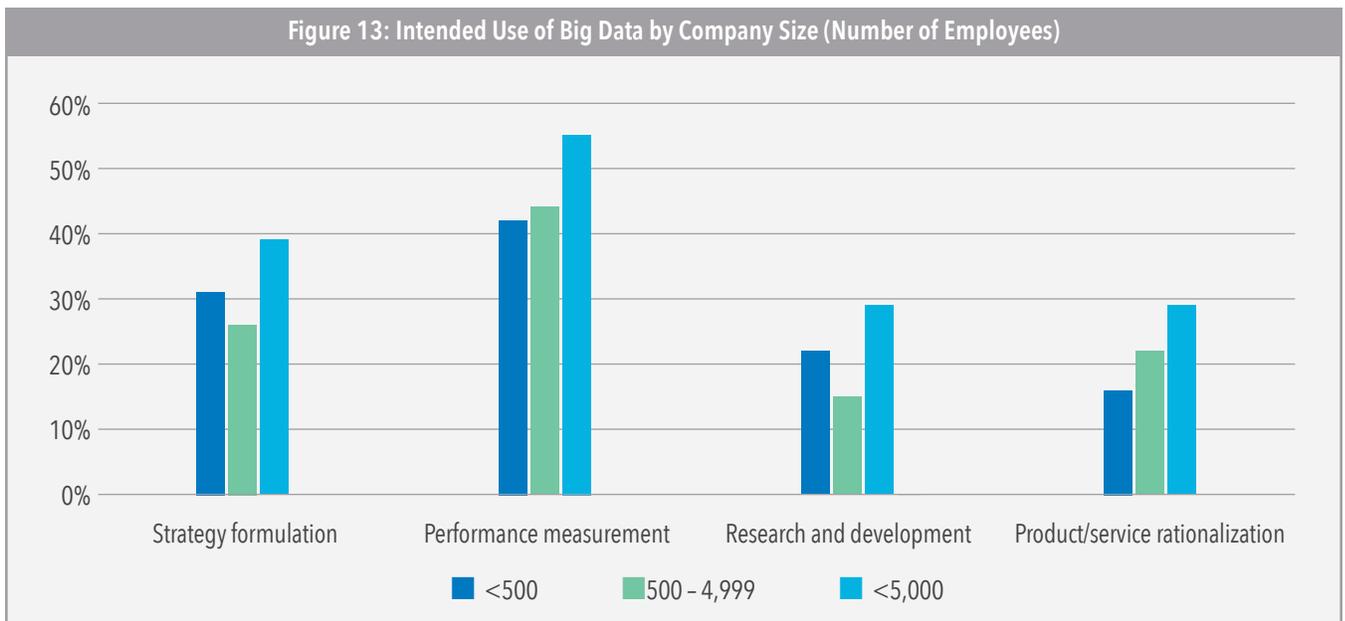
Implementation of Big Data is taking place in firms of all sizes. (See Figure 12.) Surprisingly, small companies (less than 500 employees) are slightly more likely than larger firms to report having completely implemented Big Data initiatives. This is in contrast to the implementation of leading-edge analytics (as described in our earlier report), where larger companies, as might be expected given their greater resources, tend to be further along the way. This most likely reflects a more limited project scope and smaller data sets used by small companies.



Small firms were also more likely to only be at the beginning stage of implementation or still scoping it out, reflecting the more limited resources of these companies. Still, most small companies are pursuing Big Data initiatives, reflecting the ability of Big Data and advanced analytics to help small companies more effectively compete against larger ones.



Similar to our earlier finding regarding the use of leading-edge analytics, larger firms are more likely than smaller ones to be planning on using Big Data in a large number of processes (see Figure 13).





The Role of Accounting and Finance Professionals

Today's data environment differs from that of the past in the immediacy and availability of data and the ability to access it. The deployment of this data and the technologies that exploit it present both opportunities and threats to the management accounting profession. In order to stay relevant, finance professionals must take advantage of opportunities to create value around Big Data. This includes addressing the areas of data governance, the use of data to gain insight into business trends and an organization's operations, and the use of Big Data to enhance organizational risk management.

Data Governance

Data governance is a critical underpinning for Big Data and is difficult for large, complex organizations to achieve. Given the discipline, rigor, and structure in thinking that finance professionals have around financial data, they should be well placed to take a stronger role in data governance activities.

Linked to data governance is the issue of data privacy. With the extensive use today of personal data in Big Data activities, this is a major concern both from regulatory, legal, and customer perspectives. As a result, appropriate governance needs to be in place around the security and use of data, and finance professionals can help ensure that this is the case.

The key to success with Big Data is establishing strong governance over data quality and standards. Finance professionals can help make internal data sets more secure and robust, increasing their value. Consistent with their traditional stewardship role, finance professionals can help build trust in the quality and provenance of data. Working with others, they can ensure the data used in critical decision making is robust and from reliable sources.

Gaining Insights

What holds finance managers back from generating value from Big Data? Most of all, determining what data they need to make different business decisions. And next, getting other functions and units to share information.¹⁰

Finance has a unique position that provides a holistic view of the business and enables it to understand the controls and processes in place throughout the organization. As new technologies free up finance resources, finance will create opportunities for it to exploit its unique view of the organization by taking on a more strategic role, enabling it to move up the value chain.

There is a significant opportunity for finance professionals to support the business-critical use of data. They can work with other business functions to more effectively support planning and decision making. They can provide analysis to help business functions understand the financial implications of their activities or plans. They can help business functions improve the quality of information that goes into financial decision making. Big Data provides opportunities for better analysis and new insights to support these activities.

¹⁰ "Finance: Big Data Benefits and Challenges," Tata Consultancy Services, on.tcs.com/2piJdyM.



Risk Management

“Finance professionals are increasingly concerned with the impact of external forces on enterprise performance, ranging from regulatory changes and supply-chain risks to natural disasters and threats to company reputation and brand. In addition, they are increasingly involved in assessing the risks of companies’ strategies for growth, including mergers and acquisitions and entry into new and emerging markets.”¹¹ Finance professionals can leverage the resource of Big Data to help organizations anticipate or preempt risks—and protect performance. For example, social media can effectively indicate early warning systems of shifts in consumer sentiment or serious social and political risks. By including diverse sets of data in their calculations, accountants and finance professionals can help better identify and mitigate the risks faced by their organizations.

Upskilling to Meet the Challenges

In order to exploit the digital transformation of business, management accountants will need to be able to explore new ways to manage, analyze, and extract value from data, to apply analytical and critical thinking skills to address strategic issues, and to identify the most useful questions Big Data can answer.¹² They will need to develop new skills, including enhanced abilities to organize, structure, and understand data sets; the ability to provide more in-depth, strategic analysis; and the ability to collaborate across the enterprise with other functional teams. Communication and interpersonal and leadership skills will also become even more important for accountants and finance professionals in the new silo-less, Big Data-generating corporate environment.¹³ The newly updated IMA Management Accounting Competency Framework provides a good overview of the skills needed by today’s finance professionals.¹⁴



¹¹ ACCA (Association of Chartered Certified Accountants) and IMA, “Big data: its power and perils,” 2013, bit.ly/2pY2yW3.

¹² Raef Lawson, “Management Accounting Competencies: Fit for Purpose in a Digital Age?” IMA, April 2019, bit.ly/2LG6cxC.

¹³ Raef Lawson, “New Competencies for Management Accountants,” *Strategic Finance*, March 2019, bit.ly/2nBuden.

¹⁴ IMA Management Accounting Competency Framework, April 2019, bit.ly/309rjw8.



Summary

Technology is rapidly changing the business world, and becoming “data-driven” is increasingly part of many organizations’ competitive strategy—with the harnessing of Big Data being an important part of this. Our study confirms that Big Data is “hot”—it is one of the new technologies most likely to be implemented in the relatively near future by organizations. Yet for most organizations, implementation remains very much a work in progress. The combination of Big Data and leading-edge analytics has the potential to deliver significant organizational value.

Organizations looking to maximize the benefits from mining Big Data should pay attention to several key items, including:

- Starting simple and small when first implementing Big Data projects.
- Expanding the sources of data used and exploring potential uses not only of data available internally but also of data available externally.
- Getting information based on data into the hands of those who need it, on a real-time basis.
- Getting buy-in for Big Data and leading-edge analytics initiatives at both the executive and departmental levels.
- Developing strategies for the effective use of leading-edge analytic techniques and technologies.
- Building strong data governance and quality infrastructure in order to ensure data integrity and quality.

The increased emphasis on data provides an opportunity for finance and accounting professionals, with their traditional proficiency in pulling data from a variety of information systems, manipulating that data, and gleaning insights from that data, to build on this core competency. By doing so, they can enhance their role within the organization and serve as business partners with other areas in the organization.

Process automation, self-service, and other technologies will commoditize some of the more routine aspects of the work currently performed by the finance department. But they also offer opportunities for accountants and finance professionals to assume a more strategic role in organizations and create value. Big Data is one of the transformational opportunities of the 21st Century. How it transforms the management accounting profession depends on how finance professionals respond to the challenges it creates. By developing the necessary skill sets, they can achieve true business partner status and gain a “seat at the table.”