Forbes
INSIGHTS

BETTING ON BIG DATA

HOW THE RIGHT CULTURE, STRATEGY AND INVESTMENTS
CAN HELP YOU LEAPFROG THE COMPETITION

IN ASSOCIATION WITH: **TERADATA**

CONTENTS

INTRODUCTION

The time is ripe for big data and analytics initiatives to pull leaders ahead of the pack. New and varied sources of data, including weblogs, sensors and social media streams, are weaving their way into the analytics mix, making it easier than ever to create connections that convert into actionable insights. By analyzing everything from consumer transactions to location data, organizations are realizing key business advantages and achieving a measurable impact on revenue.

The C-suite is taking notice: senior-level executives from the retail, healthcare, finance and technology sectors are finally recognizing big data's ability to engage consumers, inform product development, create operational efficiencies and ultimately drive revenue. Encouraged by these results, they're putting their money where their mouth is, investing in storage, data acquisition, talent and analytics.

As momentum around analytics builds, pioneers are beginning to emerge as organizations seek out standards of excellence. Chief among these are companies from the Asia-Pacific region whose commitment to data integration and the culture of collaboration are serving as valuable guideposts to their lagging American counterparts.

But while approaches to analytics differ, business objectives tend to merge across regions and industries. Simply put, organizations are looking to data to build new business models, discover new product offers and monetize information.

Yet, despite this shared destination, the path to big data success is often riddled with roadblocks. Silos of data can interfere with an organization's ability to share data internally, and to get a clear picture of a consumer segment or business opportunity. Many leaders are struggling to make decisions based on the data they collect, especially in the absence of a strong corporate strategy. Others, unsure of how to measure big data success, are unable to build a proper case for greater analytics investment.

Fortunately, indicators of success are fast emerging. For example, organizations are discovering that the more the CEO focuses on data capabilities, the greater the financial windfall. Similarly, the stronger the relationship between a CEO and his/her data analytics team, the more likely an organization is to invest in data-centric technologies.

There are also stirrings within the C-suite that point to greater success. The role of chief data officer, for instance, is becoming increasingly popular. In the meantime, organizations are discovering innovative strategies, from online forums to cross-functional boards, to recruit hard-to-find data science talent.

With or without the right strategy and roadmap, big data is forever changing the way organizations behave. The opportunities to drive revenue, connect with customers and develop new products are all there for the taking. Whether organizations successfully capitalize on these opportunities, however, depends on how willing they are to embrace a new cultural mindset and implement organizational changes.

> The more the CEO focuses on data capabilities, the greater the financial windfall.

KEY FINDINGS

The good news is that big data and analytics initiatives are finally earning the respect they deserve. More and more organizations are recognizing the power of deriving value from the digital universe's vast volumes of data.

- A solid majority, 59% of respondents, consider big data and analytics either a top five issue or the single most important way to achieve a competitive advantage.

- Two-thirds of respondents report that big data and analytics initiatives have had a significant, measurable impact on revenues.

- Across all categories of investment, about 90% of organizations report medium to high levels of investment, and about a third call their investment "very significant."

YOUR ODDS

Cultural, strategic and operational hurdles await those that tackle big data and analytics without a fleshed-out plan and executive support.

- Just over half of respondents reveal that the idea of a data-driven strategy is not universally accepted in their organizations, citing adapting and refining a data-driven strategy as the single biggest cultural barrier.

- Forty-four percent of respondents cite putting big data learning into action as an operational challenge.

- Only 53% of executives surveyed report that their companies' big data and analytics capabilities are above par or best of breed. A third of respondents consider themselves average, and only 6% say that they are underperforming compared with industry peers.

A GAME PLAN

Strong leadership, knowledge sharing and C-level support are among the strategies that are helping organizations leapfrog obstacles and achieve a return on their big data investments.

- In organizations where big data is viewed as the single most important way to gain a competitive advantage, over half (51%) have CEOs who personally focus on big data initiatives.

- The more the respondent knows about big data and analytics, the less likely he or she will judge the organization as above average or best of breed. For example, among data scientists, only 8% call their organizations best of breed and 10% above average.

- Companies that have established data and analytics positions at the CxO level are more likely to have above-average data analytics capabilities.

THE DAWNING OF A DATA-DRIVEN UNIVERSE

Big data initiatives are reshaping the world as we know it. By crunching ubiquitous bits and bytes, organizations are discovering new and innovative ways to design cars, test drugs, sell swimsuits and issue credit cards. Critical business decisions are now being driven by sophisticated algorithms.

At the same time, never before has there been this much data to parse. Overall, the world's digital data consists of a staggering 4.4 trillion gigabytes—a figure that's doubling every two years, according to an EMC study conducted in partnership with IDC. Social networking tools such as Facebook, Twitter, Instagram, Pinterest and LinkedIn are providing unprecedented visibility into consumer sentiment and buying behavior. The Internet of Things is helping to build smart cities and revolutionize manufacturing plants by pulling information from devices ranging from heart monitor implants to automobile sensors. And then there are today's treasure troves of open data.

When the Open Data Executive Order was signed in May of 2013, it unleashed a deluge of public information. These days, businesses such as The Weather Channel and online real estate database Zillow are using these open data sets to drive revenue, develop new products and engage consumers. In fact, the federal government is now the single largest source of open data in the U.S.

From this data-rich world is emerging a whole new generation of processes, tools and talent. Aides such as data analysis, as well as discovery and visualization tools, used to better manage and explore data, are at the center of highly competitive, worldwide markets. Prestigious universities, such as Carnegie Mellon and Rutgers, are offering master's degree programs in data science, alongside courses in Shakespeare and Sartre. And the role of the chief data officer is now popping onto the payrolls of organizations as diverse as TD Ameritrade, the U.S. Commerce Department and Cambia Health Solutions. "I can't think of an industry that doesn't have a deluge of information that can be used [for analysis], even if it's external to the organization," says Claudia Imhoff, CEO of consultancy Intelligent Solutions.

> Aides such as data analysis, as well as discovery and visualization tools, used to better manage and explore data, are at the center of highly competitive, worldwide markets.

DATA AS A DIFFERENTIATOR

Despite all the buzz surrounding big data, many organizations continue to be data rich, knowledge poor. That's because gleaning actionable insights from sources such as social media streams and consumer transactions takes more than just tools.
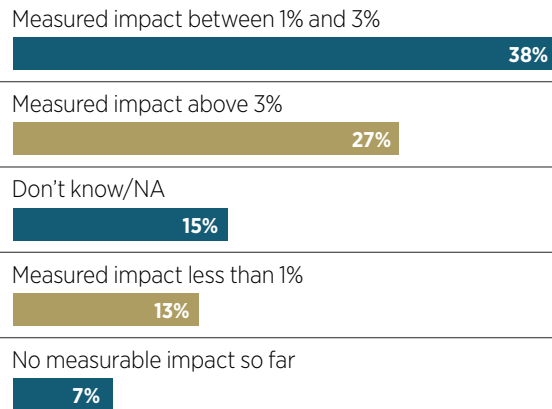
Sweeping organizational and cultural adjustments are required for businesses to reap real value from big data. Part of the challenge is that not everyone is convinced of data's power to deliver a business advantage. Many are struggling to grasp the right strategy for their business and make the investments required to realize the full potential of information. Additionally, barriers such as a lack of C-suite support, poor change management and cultural resistance can impede success.

The good news is that big data can have a positive and measurable impact on an organization's bottom line. About two-thirds of respondents report that big data and analytics initiatives have had a significant, measurable impact on revenues—that is, an increase of 1% or more. And a whopping 60% of respondents attest to a significant impact on costs.

"We're at a point now where data is a strategic asset," says David Mathison, founder of the CDO Club for chief digital officers and chief data officers and curator of the CDO Summit. "Everything else is being outsourced—infrastructure, networking, none of that is strategic; it's all outsourced to the cloud. But data and security are two things that companies are realizing they really need to focus on."

FIGURE 1: LINKING BIG DATA AND ANALYTICS TO REVENUES AND COSTS

Effect on revenue

Measured impact between 1% and 3%
38%

Measured impact above 3%
27%

Don't know/NA
15%

Measured impact less than 1%
13%

No measurable impact so far
7%

Effect on costs

Measured impact between 1% and 3%
39%

Measured impact above 3%
21%

Don't know/NA
19%

Measured impact less than 1%
15%

No measurable impact so far
6%
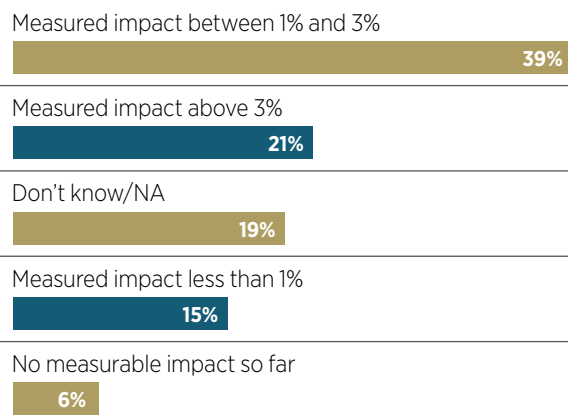
A WIDE AND VARIED LANDSCAPE

Driving this return on big data investment is a wide assortment of new data types. For years, organizations focused exclusively on collecting transactional data, from product orders to payment methods. But that's changing as businesses discover new ways to unlock the value of new data from inconvenient formats such as PDFs, video and speech. In addition, fresh sources of data are arising as companies turn to channels such as social media for customer sentiments, and devices such as smartphones for real-time location data. By accessing these previously untapped and new types of data, organizations are gleaning insights that promise to move the business forward.

Among these data sources, more than half (56%) of respondents rely on location-based data. Text, including emails, fax and PDF files, is collected by 48% of businesses. Social media trails closely behind with 43% of the vote. But most interesting is the fact that images, weblogs, videos, sensor data and speech files are being used by about a third of respondents. The result is a wide variety of data types, all of which are being integrated into business analytics tools.

In addition to traversing data types, big data initiatives are also being tackled across industries and geographies with varying degrees of success. Among the six industries surveyed, retail respondents are mostly likely to report that big data and analytics is the single most important way to gain a competitive advantage. Evidence of this can be seen in the innovative digital strategies of retailers including Nordstrom, Cabela's and Target.

Fifty-three percent of respondents from the financial services sector view big data and analytics as a top five issue that gets significant time and attention from top leadership, while industries such as telecom, technology and healthcare offer slightly lower levels of support for its ranking as a top five issue.

The fact that the financial services sector places a premium on big data is no surprise to Stuart Madnick. Madnick is the John Norris Maguire Professor of Information Technology at MIT's Sloan School of Management. "There aren't many gold bars in their vaults anymore, so data is really the only thing they have to deliver or add value," says Madnick. "It's not too surprising that in almost all aspects of information technology advances, over and over again, you find financial services at the lead."

56%

56% of respondents rely on location-based data.

From a regional perspective, a whopping 41% of Asia–Pacific executives consider big data and analytics the single most important way for companies to gain a competitive advantage compared with a negligible 19% of respondents from North America. This is clearly a sign that corporate America is struggling to reap real value from its zettabytes.

A key contributing factor to this regional divide is cultural, according to Kathleen S. Long, CEO of consultancy Montage Analytics. "Oftentimes, American companies have competing business units that don't share information or have siloed information that isn't distributed to all the units that need it," she says. "So American companies' culture tends to be less synthesized than Asian companies'." The result is a hampered ability to properly integrate data across an enterprise and then mine it for actionable insights.

FIGURE 2: WHAT KINDS OF DATA DO YOU USE?

Location-based data	56%
Text (emails, fax, PDF)	48%
Social media	43%
Images	39%
Weblogs	38%
Videos	37%
Sensor data	31%
Speech	30%
Other	4%
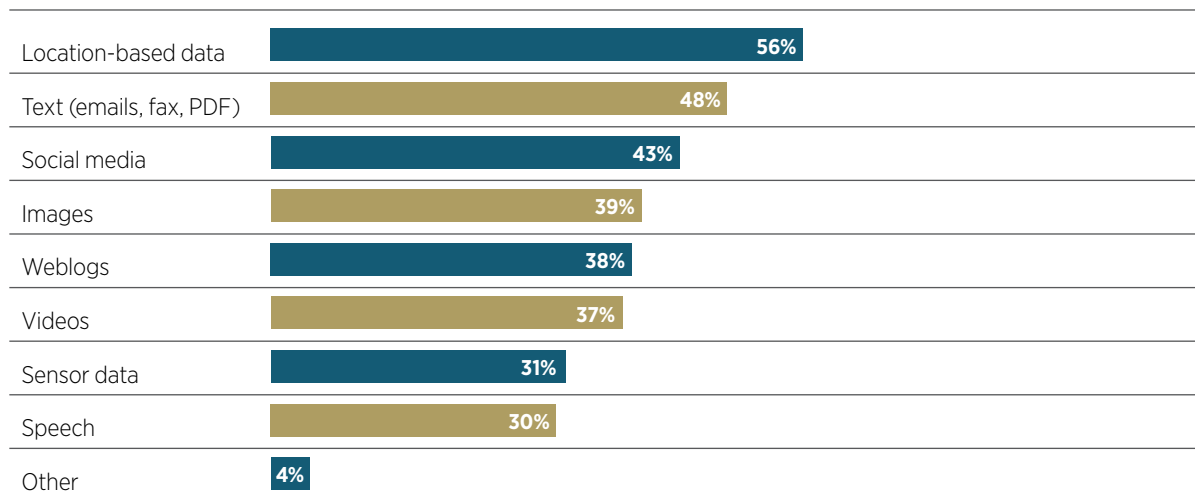
FIGURE 3: IMPORTANCE OF BIG DATA AND ANALYTICS

|	
Is a top five issue that gets significant time and attention from top leadership	38%
Is important but is only one of many other challenges/opportunities that we need to address	26%
Is the single most important way for us to gain competitive advantage	21%
Don't know/NA	12%
Is not defined	3%
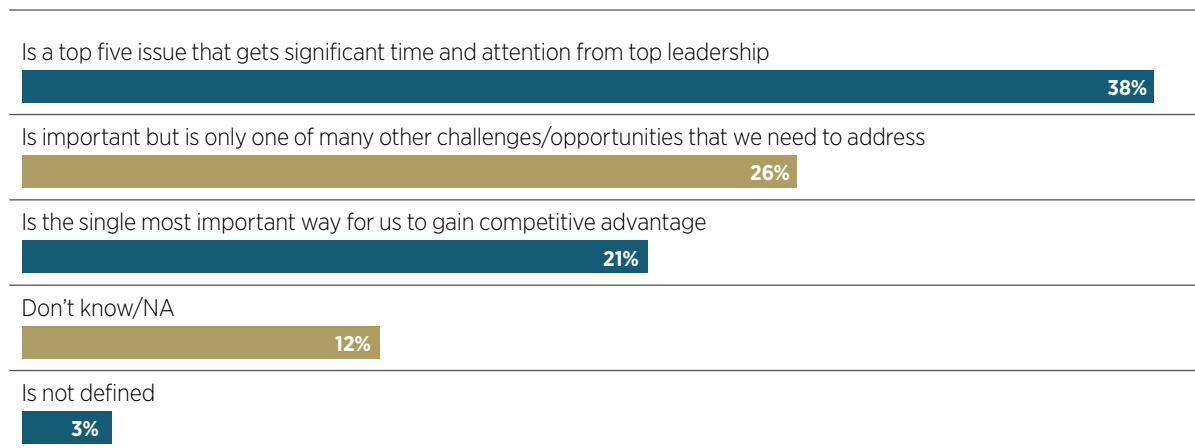
WHAT ORGANIZATIONS WANT

Despite these variations, organizations have shared opinions of what they hope to achieve via big data and analytics. According to respondents, the top three potential opportunities for innovation include creating new business models (54%), discovering new product offers (52%) and monetizing data to external companies (40%).

"Firms want to move towards analytics because that's how you provide improved customer service and new products, and drive revenue," says John Bottega, a senior advisor with the EDM (Enterprise Data Management) Council.

Bottega points to today's leading financial services firms as a perfect example. After years spent focusing on issues such as regulatory compliance, reporting and risk exposure, Bottega says an increasing number of firms are adopting a more proactive approach to driving revenue via "big data, analytics and advanced analytics. By being able to look at your data and say, 'I've identified patterns in how my customers behave,' banks can produce more innovative products and services because they know what customers want. That's at the heart of analytics."
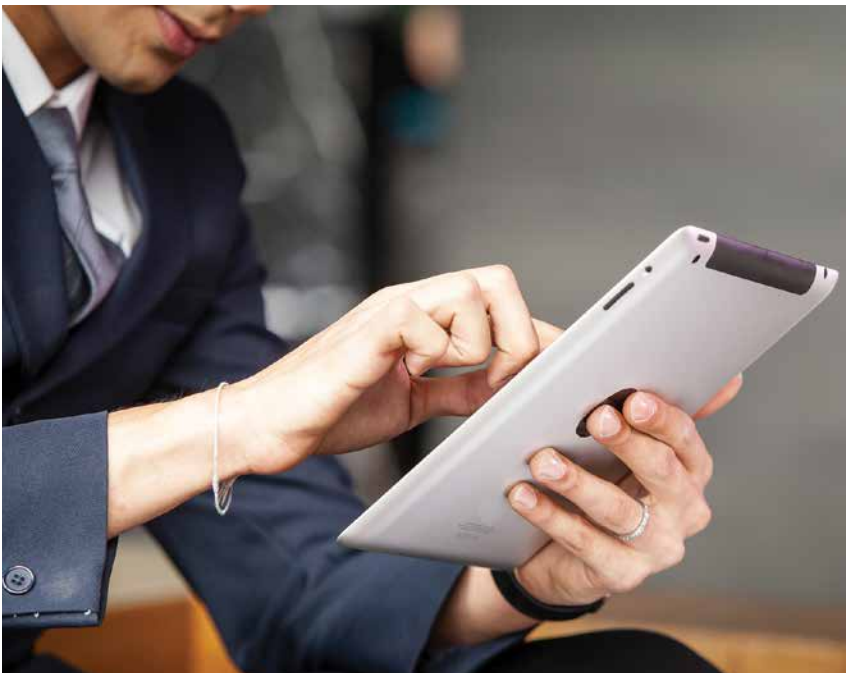
54%

54% of respondents believe potential opportunities for innovation include creating new business models.

51%

51% of respondents cite adapting and refining a data-driven strategy as a key cultural challenge.
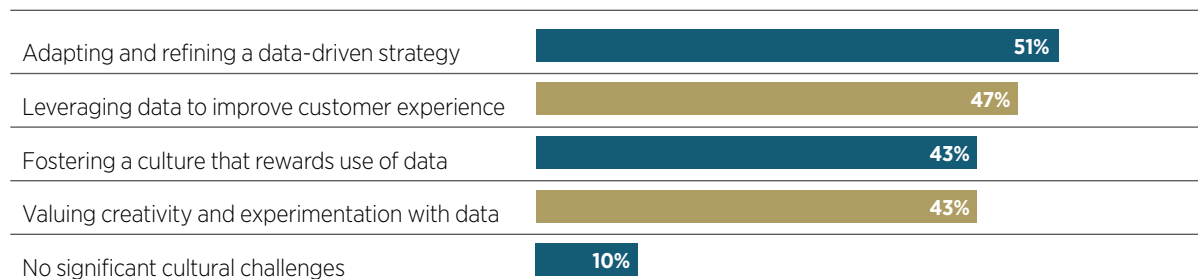
IMPEDIMENTS TO PROGRESS

There are plenty of obstacles standing in the way of organizations' big data success. Barriers can be broken down into three main categories: cultural, strategic and operational. From a cultural standpoint, 51% of respondents cite adapting and refining a data-driven strategy as a key cultural challenge. Second is an inability to improve the customer experience by leveraging and listening to the data (47%). And 43% of respondents point to fostering a culture that rewards the use of data as a significant challenge.

Part of the problem is that data–driven business models represent a break from the past that can call for a huge cultural upheaval. Almost overnight, employees must make data a priority, be willing to share data sets across departments and assume shared responsibility for data collection, quality and analysis. It's a tall order that can cause workers to recoil. However, if executed properly, businesses stand to reap substantial rewards, as in the case of sporting goods retailer Cabela's.

"There's a culture of integration with rites of passage that make the transfer of data and data analytics more likely to happen. Cabela's has these rites of passage," says Jeff Tanner, dean of Old Dominion University's Strome College of Business. "At Cabela's, it's not uncommon for somebody out of the analytics group to go work in merchandising or for someone in merchandising to work in analytics, so you get these cross-fertilizations. So when you have something as new and as powerful as big data, it's far more likely that you'll see it become ingrained across the organization."

FIGURE 4: CULTURAL CHALLENGES

Adapting and refining a data-driven strategy	51%
Leveraging data to improve customer experience	47%
Fostering a culture that rewards use of data	43%
Valuing creativity and experimentation with data	43%
No significant cultural challenges	10%

RBI must also contend with Europe's vast and varied landscape. Local currencies, regional regulations, language barriers— they are all "additional challenges compared to the U.S."

That's easier said than done, according to Markus Lochner, senior program manager at Raiffeisen Bank International AG. RBI prides itself on forging long and meaningful relationships with its customers via face-to-face encounters. "We didn't used to be so much a data-driven company," admits Lochner. "But nowadays, things are changing. We are trying to go in the direction of providing [our employees] with data on a more timely basis and with a more detailed view."
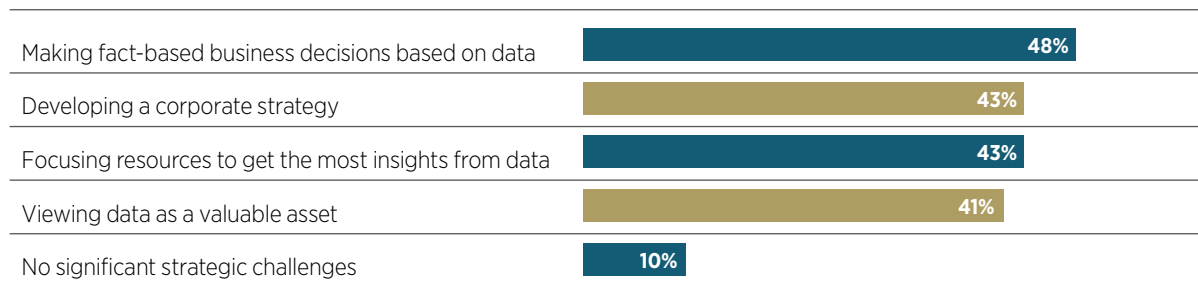
With headquarters in Vienna, Austria, RBI is an excellent representation of Eastern Europe's attitude toward big data and analytics. Fifty percent of Eastern European respondents consider big data initiatives a top five issue that gets significant time and attention from top leadership. A smaller but still sizable 33% see it as the single most important way to gain a competitive advantage.

But while collecting and crunching data is helping organizations like RBI improve its fact-based decision making, Lochner says employees still need convincing that "you need to do analytics before you then go into your next level of discussion and decision making." In fact, 48% of respondents regard making fact-based business decisions based on data as a key strategic challenge, and 43% cite developing a corporate strategy as a significant hurdle. Focusing resources to get the most insights from data also ranks high (43%) as an obstacle.

RBI must also contend with Europe's vast and varied landscape. Local currencies, regional regulations, language barriers—they are all "additional challenges compared to the U.S.," says Lochner. "With every country, like Hungary, for example, you have to translate what you have been doing into a local language, fit it into the Hungarian way of doing business and really map it to the situation in Hungary. It's quite a significant investment."

Respondents also face operational challenges when it comes to leveraging big data and analytics. These include putting big data learning into action, building organizational models to capitalize on data, empowering business functions with access to data, and measuring and tracking data to govern the business, all of which received equal billing as obstacles.

FIGURE 5: STRATEGIC CHALLENGES

Making fact-based business decisions based on data	48%
Developing a corporate strategy	43%
Focusing resources to get the most insights from data	43%
Viewing data as a valuable asset	41%
No significant strategic challenges	10%

SHOW ME THE MONEY

Fortunately, the ongoing challenge of getting data into the hands of people who can effect real change isn't stopping organizations from putting their money where their mouth is. Across all categories of investment, about 90% of organizations report medium to high levels of investment, and about a third of respondents consider their investment "very significant."

Not quite as encouraging, however, is where these investments lie. The largest percentage—37%—of respondents are making very significant investments in storage, while 35% are focused on data acquisition. The least-cited investment is in analytics (30%), while only 34% of respondents allocate funds for talent. This prioritization of investments shows how big data and analytics are still very much in their infancy.

In fact, heavy investments in data storage indicate that many organizations are still in the preliminary stages of managing, storing and sorting huge volumes of data.

Organizations ahead of the maturity curve, on the other hand, are focused on deriving value from their analytics efforts by investing in both organizational change and in-house talent. Ask Lochner where RBI invests most heavily and he'll say, "Definitely not in storage, definitely not in hardware or software." Rather, Lochner says funding must support "how you are changing the company" and teaching employees "to move into this new digital world. Change management is really the top topic of investment here." For this reason, RBI relies on everything from large-scale training sessions to company newsletters to evangelize its big data initiatives across the organization.
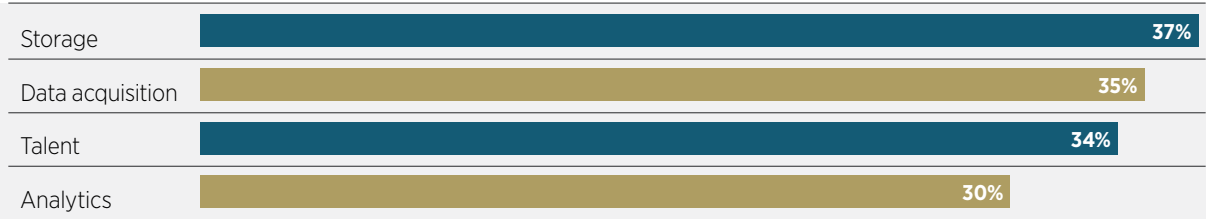
About 90% of organizations report medium to high levels of investment, and about a third of respondents consider their investment "very significant."

FIGURE 6: LEVELS OF BIG DATA AND ANALYTICS INVESTMENT ACROSS FOUR CATEGORIES

5-Very significant

5

Storage	37%
Data acquisition	35%
Talent	34%
Analytics	30%

4

Storage	36%
Data acquisition	35%
Talent	37%
Analytics	36%

3

Storage	23%
Data acquisition	20%
Talent	22%
Analytics	23%

2

Storage	2%
Data acquisition	6%
Talent	5%
Analytics	8%

1-No investment

1

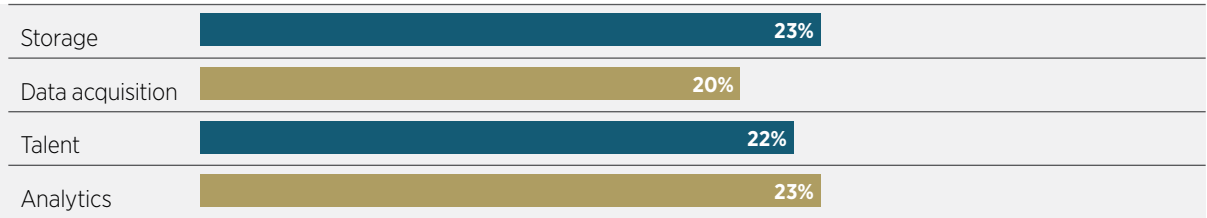|	
Storage	1%
Data acquisition	2%
Talent	2%
Analytics	2%

BUILDING A BUSINESS CASE

With most dollars earmarked for storage and not analytics, it's no wonder that companies are having a tough time building a business case for greater investment. The largest group of respondents (41% to 47%) is able to identify use cases for how data analytics impacts business objectives such as deepened customer insights, improved operational efficiencies and enhanced financial risk management.

The bad news: this same group hasn't been able to quantify business cases for these important big data initiatives. And a startling one in 10 respondents (9% to 11%) reveal that their companies have no clear vision of how big data initiatives will affect the business—or are unconvinced they even will.

What's worse, few respondents have a clear-cut understanding of the investment required to realize the potential of big data. Forty-seven percent cite understanding the investment needed to execute data-driven business models as an impediment to realizing the potential innovation opportunities of big data.

Imhoff blames the failure to link big data to business value on today's "jumping-on-the-bandwagon" approach to analytics. "Part of the problem with big data is that we have become so enamored with the technology, we've forgotten what business problems we're trying to solve with it," she says. As a result, she adds, corporate bean counters "are looking at all of the money being poured into big data environments and not seeing a whole lot of value coming out of them. The industry is paying far too much attention to the big data idea without asking the appropriate questions, like, 'What's the ROI for this initiative, and how do I measure it?' We still need good solid case studies of companies
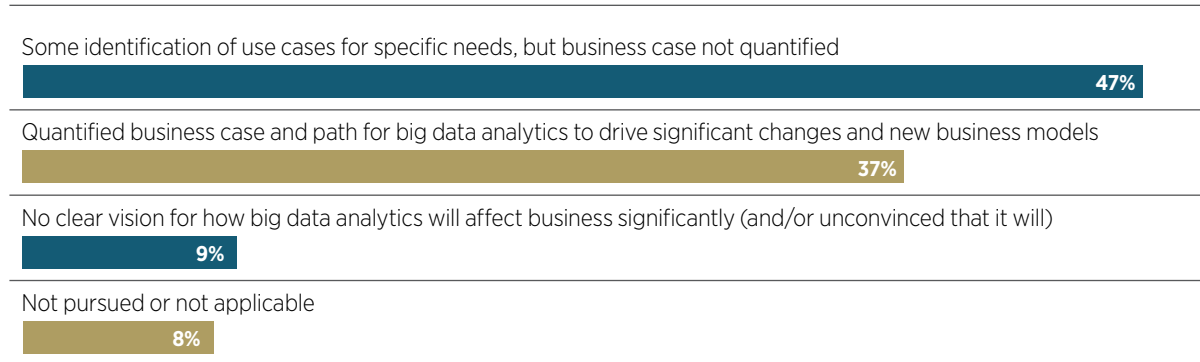
Few respondents have a clear-cut understanding of the investment required to realize the potential of big data.

that determined, 'This was the business problem we needed to solve, here's how we solved it using big data, and here's the benefit.'"

Tanner agrees. "The real challenge is the ability to document and estimate the return on investment," he says. Unfortunately, a lack of experience in tracking data's impact and the prevalence of soft, intangible returns can make calculating an ROI even more challenging. In the end, though, Tanner says, "the reality is, if we can't do better at estimating the hard returns, we're not going to win the argument" for greater investment.

Another factor standing in the way of greater investment in data analytics is the overarching perception that big data is the purview of IT. "Historically, the financial group has always seen IT as a target when it comes to cost cutting," says Mathison. "It's usually about, 'Where can we save money?' and not, 'How can we invest in strategy, R&D and technology?' With data being associated with tech, it's falling into the bucket that it's just a cost center and it shouldn't be something to invest in. But I think that's turning around."

FIGURE 7: CUSTOMER INSIGHT

Some identification of use cases for specific needs, but business case not quantified

47%

Quantified business case and path for big data analytics to drive significant changes and new business models

37%

No clear vision for how big data analytics will affect business significantly (and/or unconvinced that it will)

9%

Not pursued or not applicable

8%

STRANGE BEDFELLOWS

Helping to move things along is a strengthening correlation between C-suite involvement and big data's status in an organization. Consider this: a quarter of respondents say that big data initiatives are only one of many important issues in their company. Another 3% report that big data and analytics are simply "not defined" as a priority. However, a deeper dive into the survey data reveals an insightful overlap: of the 21% of respondents that cite big data initiatives as the single most important way to gain a competitive advantage, more than half say it's a key element of the CEO's focus.

21%

Of the 21% of respondents that cite big data initiatives as the single most important way to gain a competitive advantage, more than half say it's a key element of the CEO's focus.

The converse is also true. In organizations where big data is important but only one of many challenges and opportunities, only several initiatives are being led at the C-suite level by business champions (as opposed to significant initiatives or being a key element of the CEO's focus). In other words, the more a company's top brass commits to big data analytics, the more likely it is to view analytics as a key competitive advantage worthy of investment.

"The most successful companies we've seen are where the chief digital and chief data officer report to the CEO and have a seat on the board to report on what they're up to," says Mathison.

A strong relationship between a CEO and a data analytics expert can not only help set priorities, but it can also spur greater investment in data-centric tools and technologies. "Statistically, [data analytics] projects are costly, and they often fail," says Long. "This is why it's important that it gets championed at the very top. It has to be seen as something that is going to move the company's mission forward. IT and other technical people are in a really good position to make the case, but ultimately, it has to be championed by top leadership or it will be another one of those projects that everybody works hard on, costs a lot of money, but goes nowhere."

A strong relationship between a CEO and a data analytics expert can not only help set priorities, but it can also spur greater investment in data-centric tools and technologies.

FIGURE 8: STRATEGIC VISIBILITY/COMMITMENT VERSUS IMPORTANCE OF BIG DATA AND ANALYTICS

	Total	Big data analytics is not being sponsored at the CxO, CxO-1 or CxO-2 levels, but there may be some significant local initiatives	Several initiatives are being led at the CxO, CxO-1 or CxO-2 levels by business champions	One or more significant data analytics initiatives are being led at the CxO-1 level	Big data analytics are a key element of CEO's focus	I don't know/not applicable
Total	316	51	93	71	63	38
Is not defined	3%	10%	4%	0%	2%	3%
Is important but is only one of many other challenges/ opportunities that we need to address	26%	33%	42%	24%	8%	8%
Is a top five issue that gets significant time and attention from top leadership	38%	31%	43%	61%	30%	5%
Is the single most important way for us to gain competitive advantage	21%	24%	11%	15%	54%	0%
I don't know/ not applicable	12%	2%	0%	0%	6%	84%

SOLDIERS AND THE C-SUITE

"Regardless of a CEO's influence on the big data investment, C-suite support doesn't guarantee success. Certainly, it can nudge big data initiatives to the top of the priority list. But it takes a granular understanding of data analytics to cull real business benefits from pools of petabytes," says Matt Ariker, chief operating officer of the Consumer Marketing Analytics Center at McKinsey & Company. Yet 46% of respondents say having talent that can recognize innovations in data is a challenge. That's because there's currently a shortage of data scientists—specialists with expertise in advanced analytics, data integration, domain knowledge, business acumen and natural-born curiosity.

That's not to suggest that organizations are entirely without data-savvy workers. But while three-quarters of respondents have an analytics role in their company, the largest group (37%) was made up of CIOs and CTOs—technology professionals whose attention is typically divided among multiple tasks. Only about three in 10 respondents boast employees more narrowly focused on data and analytics with the titles of chief data officer and data scientist. And a dismal 11% of respondents have a chief analytics officer on the payroll.

Promising to bridge this skills gap is the burgeoning role of the chief data officer. "The CIO is typically so involved, and in many cases, overloaded with the computer infrastructure, the networking, the hardware, the software," says Madnick. "That's why we think the CDO plays such a key role in getting the true value [of data analytics]."

Major corporations are already taking note. Starbucks, the U.S. Department of Commerce, Lloyd's of London and Wells Fargo Bank number among the organizations with chief data officers at the helm of their analytics efforts. And by the end of 2014, the CDO Club surpassed 1,000 members worldwide.

According to Mathison, the placement of a chief data officer sends an important message to employees that the company is serious about its commitment to big data and analytics. "Hiring a chief data officer is a sign that they really want to start to focus on [data analytics] as a strategic asset," says Mathison. After all, he adds, "Data is the life blood of the digital economy. We need to have someone who really understands metadata, taxonomies and integrating new data sets."

To satisfy this increasing appetite for data science talent, universities are stepping up with new programs and revised curricula. NYU Stern, the University of Wisconsin, USC Marshall—they all offer specialist master's programs dedicated to data analytics, or have incorporated analytics teachings into their MBA programs. Many companies are looking outside IT for talent. For example, professionals such as neurosurgeons, astrophysicists and marine biologists can easily be trained in data science while bringing vast domain knowledge to the table. Others are looking inward in order to identify star employees that are ripe for training in data analytics.

The next step involves fostering an honest and meaningful dialogue between a company's data scientists and its business leaders.
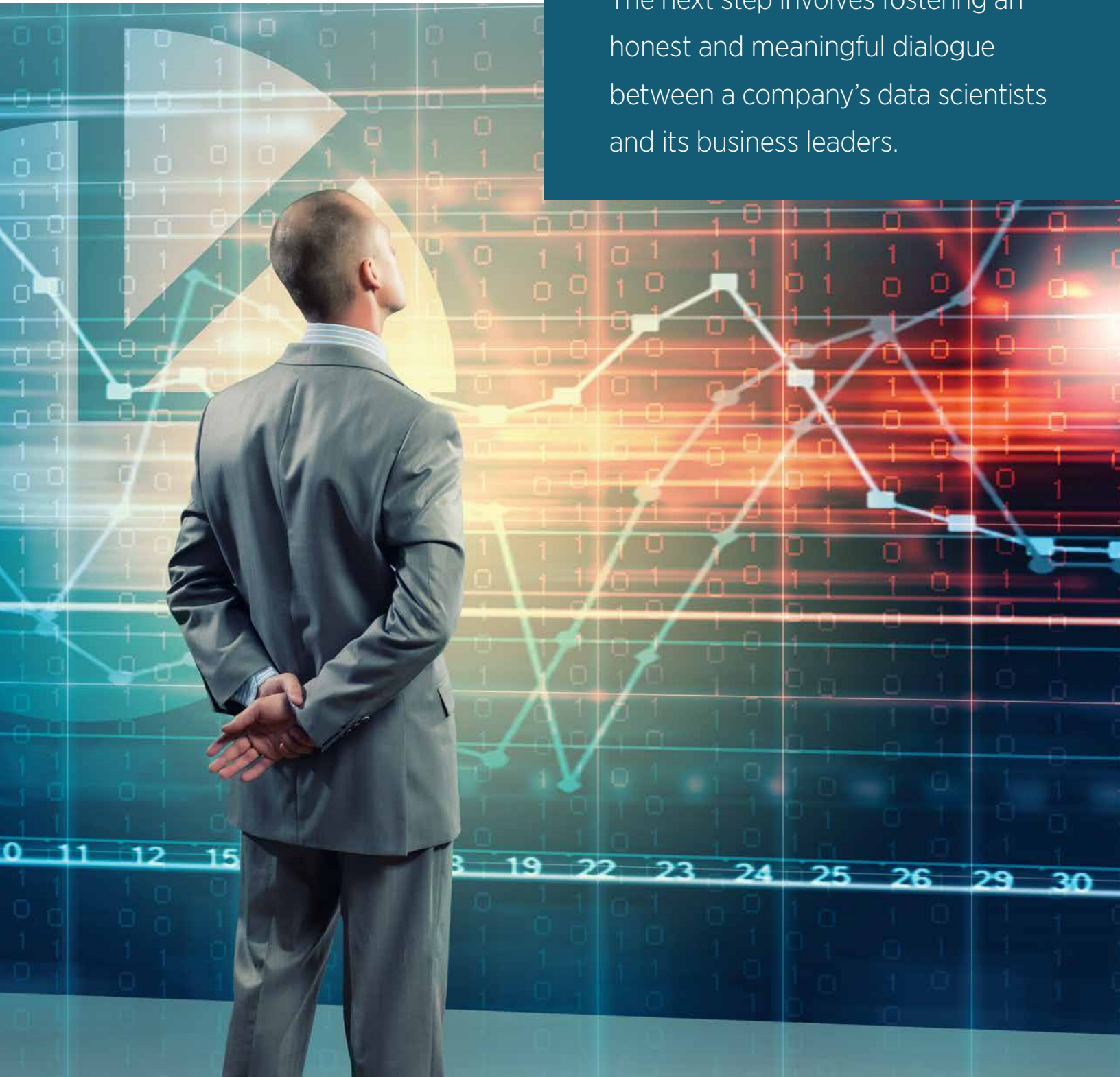
STARTING A DIALOGUE

"Establishing a brain trust capable of connecting business strategy to data, and drawing value from everyday bits and bytes is a critical component of any big data initiative. The next step involves fostering an honest and meaningful dialogue between a company's data scientists and its business leaders," says McKinsey's Ariker.

I t's an objective many organizations are failing to achieve if survey respondents' varied perception of their big data success is any indication. More than half (53%) of executives surveyed ranked their companies' big data analytics capabilities above par or best of breed. A third consider themselves on par with the industry average. Only 6% say that they're lagging behind their industry peers.
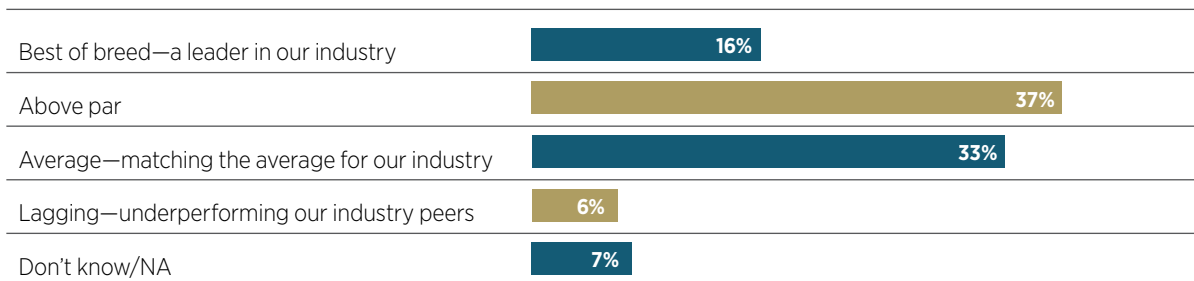
However, a grimmer picture emerges from the responses of analytics experts. For instance, among data scientists, only 8% consider their organization's big data analytics capabilities best of breed, while 10% regard them as above average. Twenty-one percent consider their companies' capabilities average, and a whopping 30% of data scientists—the majority—believe they're underperforming compared with their industry peers.

A similar pattern emerges for chief analytics officers and chief data officers, where confidence in their company's data analytics capabilities appears to wane. In fact, the more survey respondents know about big data and analytics, the less likely they are to perceive the organization's capabilities as above average.

One possible explanation for this difference of opinion is that organizations with C-level support for data initiatives tend to have more-established data practices in place and, therefore, above-average capabilities. Another interpretation of the survey findings: chief information officers and chief technology officers, while dedicated to data analytics as a business priority, aren't in the trenches on a day-to-day basis, getting a firsthand look at what's really going on behind the scenes.

How much data is the company collecting? What is the business value of this data? What is it costing to store and manage this information? How often are data scientists updating algorithms and revamping age-old models for more up-to-date insights? Data scientists are more likely to hold the answers to all these questions as they toil away in the trenches. It follows that a failure to share this information with more business-oriented C-level executives on a regular basis can lead to sizable gaps in knowledge and differences in perception over data analytics performance.

FIGURE 9: HOW DO YOUR ORGANIZATION'S BIG DATA ANALYTICS CAPABILITIES COMPARE WITH YOUR INDUSTRY COMPETITORS'?

Best of breed—a leader in our industry	16%
Above par	37%
Average—matching the average for our industry	33%
Lagging—underperforming our industry peers	6%
Don't know/NA	7%

An effective strategy for evangelizing data analytics internally is to create online forums and discussion groups

The same rule applies to respondents who classify their role as "other"—a staggering 74% of which don't know of their company's big data initiatives. And another 45% of these respondents see their organization as lagging. These respondents don't play a part in data analytics at all. Rather, they occupy positions in human resources, sales, finance and warehousing, and likely have little to no contact with the company's data science initiatives.

This is revealing in a couple of ways. First, it suggests that big data and analytics have not penetrated into the ranks of those not traditionally involved in the use of data to make decisions. Second, and more important, it's a symptom of a company's failure to communicate the importance of big data and raise awareness of the value it can bring to business among less tech-savvy personnel. This has to change.

One approach is to establish a Center of Excellence —a multi-disciplinary group of IT and business-line leaders who meet regularly to discuss the organization's big data analytics initiatives, the challenges ahead and what role each department can play in tackling these obstacles head-on. Another effective strategy for evangelizing data analytics internally is to create online forums and discussion groups where employees can learn about new data projects, as well as contribute feedback on ongoing initiatives.

FIGURE 10: HOW BIG DATA AND ANALYTICS CAPABILITIES ARE JUDGED BY DIFFERENT DATA SCIENCE ROLES
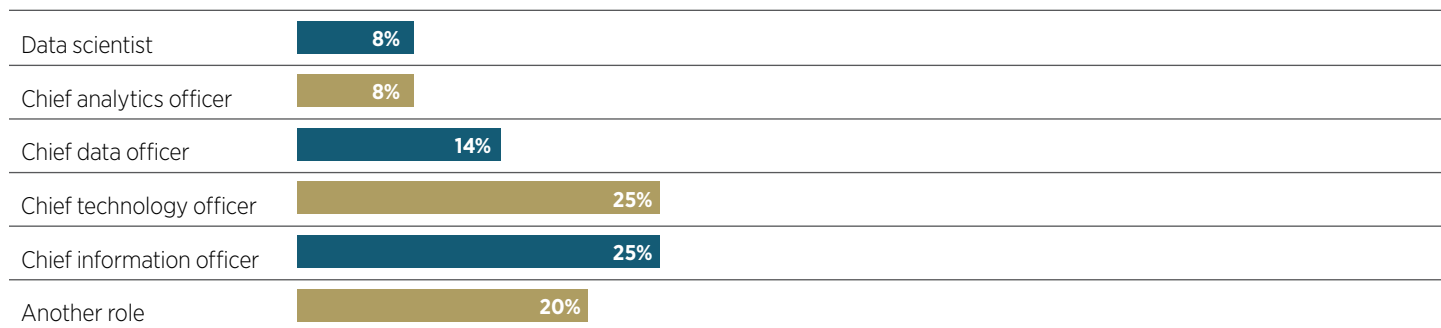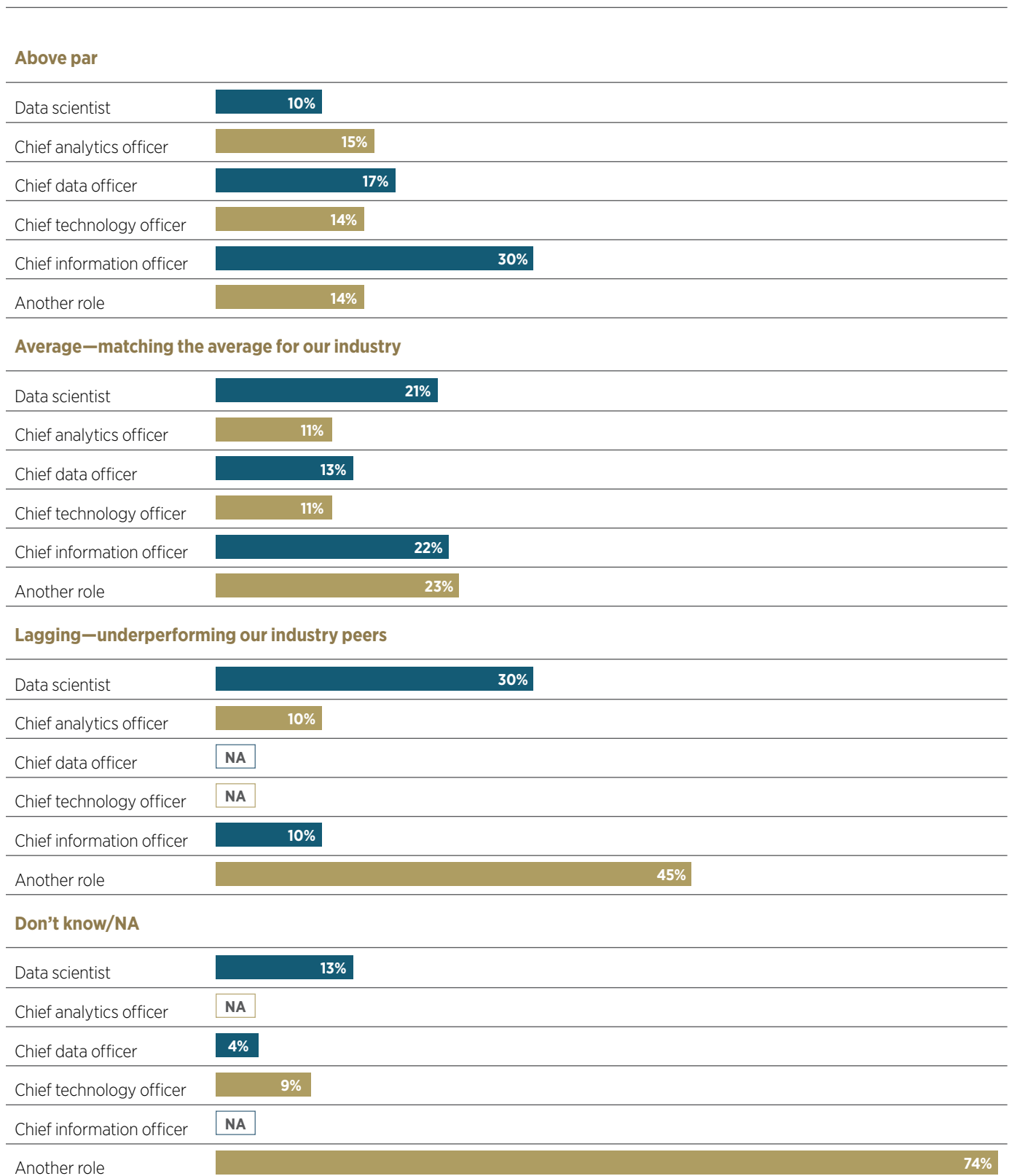
Best of breed—a leader in our industry

Role	Percentage
Data scientist	8%
Chief analytics officer	8%
Chief data officer	14%
Chief technology officer	25%
Chief information officer	25%
Another role	20%

Above par

Data scientist	10%
Chief analytics officer	15%
Chief data officer	17%
Chief technology officer	14%
Chief information officer	30%
Another role	14%

Average—matching the average for our industry

Data scientist	21%
Chief analytics officer	11%
Chief data officer	13%
Chief technology officer	11%
Chief information officer	22%
Another role	23%

Lagging—underperforming our industry peers

Data scientist	30%
Chief analytics officer	10%
Chief data officer	NA
Chief technology officer	NA
Chief information officer	10%
Another role	45%

Don't know/NA

Data scientist	13%
Chief analytics officer	NA
Chief data officer	4%
Chief technology officer	9%
Chief information officer	NA
Another role	74%

CONCLUSION

In today's data-centric world, organizations must be willing to make sweeping cultural, strategic and organizational changes. Industries such as retail, and leaders such as Asia-Pacific executives, are leading the way with new and innovative approaches to collecting and mining vast volumes of information. The payoff is impressive. Retailers such as Cabela's and Target are creating highly targeted and personalized marketing campaigns that engage customers and increase lifetime value. Scientists and researchers are using data to develop next-generation products at record speed. Even staid manufacturing companies are boosting workforce productivity and assembly-line efficiencies with tiny sensors and the right data.

Scientists and researchers are using data to develop next-generation products at record speed.

Business advantage, increased revenue, reduced costs—they are all opportunities presented by big data and analytics. The good news is organizations are catching on: 38% of respondents consider big data and analytics a top five issue. But as our survey findings indicate, there is no magic bullet for big data success. Moving forward, organizations must embrace the following best practices:

• Gain enterprise-wide acceptance of data-driven strategies

Be it the CIO or the warehouse manager, employees need to understand how big data and analytics can improve their lives by increasing productivity, streamlining workflow processes, improving customer service and driving sales.

• Understand the investment needed to execute these strategies

For once and for all, IT needs to shed its long-held reputation as a cost center and help build a strong business case for investments in data storage, data acquisition and analytics.

• Hire the right talent

With a labor shortage looming, it's up to the HR department to find new and innovative ways to attract technology professionals with the right combination of tech smarts, business acumen and inquisitiveness.

• Spark a dialogue between business-line leaders and data scientists

They may not speak the same language, but business-line leaders and data scientists need to find a way to communicate their needs and the role big data and analytics can play in supporting key business objectives.

• Ensure change management success

Everything from online training sessions to company newsletters can help teach employees the benefits and challenges of big data and how to make the most of their analytics initiatives, with or without a degree in data science.

• Put your money where your mouth is

Drawing insights from big data takes storage capacity, vast amounts of information, the right talent and plenty of analytics tools—all of which require money to purchase and maintain. By investing in the right assets, organizations can ensure they derive the greatest value possible from their data sets.

By following these best practices, organizations can gain a competitive advantage in a crowded and highly competitive market. However, those that refuse to accept the cultural, strategic and operational challenges required for big data success are destined to perish. "Many companies that are intuition- or gut-driven are going to get acquired or put out of business by the companies that are much more analytically driven," predicts Imhoff. "We need to educate whole organizations about how they can think more analytically."

For more details about this research, including executive briefs and a self-assessment tool, please visit, www.Teradata.com/ForbesSurvey.

METHODOLOGY

The data in this report is based on a global survey of 316 executives conducted by Forbes Insights in spring 2015. Their titles included chief information officer (23%), data scientist (15%), chief technology officer (14%), chief data officer (13%), chief analytics officer (11%) and other (24%). Industries included financial services (27%), technology (27%), retail (16%), telecommunications (15%), healthcare (9%) and consumer products (7%). Regions included North America (43%), Europe (34%), Asia Pacific (22%) and Middle East (1%). All companies represented had at least $500 million in annual revenue; 36% had $2 billion to $10 billion in revenue; 28% had more than $10 billion in revenue.

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