

# Big data

Lessons from the leaders

A report from the Economist Intelligence Unit

# Contents

About this report	2
Executive summary	3
Introduction	5
<b>1 Data and the bottom line</b>	7
<b>2 Putting strategy first</b>	9
EMI Music: data-driven marketing	10
Data democratisation at dunnhumby	11
Data for secondary markets	11
<b>3 Talent, not just technology</b>	12
What's in an algorithm?	13
Drowning in data	14
<b>4 Discovering what your customers <i>really</i> think</b>	16
You are what you click	17
Market research via social media	18
<b>5 Conclusion</b>	19
<b>Appendix: survey results</b>	20

# About this report

*Big data: lessons from the leaders* is an Economist Intelligence Unit report, sponsored by SAS. It explores how far along companies are on their data journey and how they can best exploit the massive amounts of data they are collecting.

The Economist Intelligence Unit bears sole responsibility for the content of this report. The findings do not necessarily reflect the views of the sponsor.

The paper draws on two main sources for its research and findings:

- A global survey of 752 executives, conducted in March 2012. Fifty percent of respondents were C-level or board-level executives, and 55% were from companies with annual revenue in excess of US\$500m. Thirty-three percent of respondents were from Western Europe, 28% from North America and 26% from Asia-Pacific. The remainder hailed from the Middle East and Africa (6%), Latin America (4%) and Eastern Europe (2%). Companies with revenue of less than US\$500m comprised 45% of responses; 18% of respondents came from companies with revenue of US\$10bn or more. Nineteen industries were surveyed, including the following: manufacturing (12%), IT and technology (11%), financial services (11%), professional services (10%), healthcare, pharmaceuticals and biotechnology (8%) and consumer goods (7%).

- A series of in-depth interviews with senior executives, listed below.
  - Max Gadney, founder, After the Flood
  - Piyanka Jain, president and CEO, Aryng
  - Gary Loveman, CEO, Caesars Entertainment
  - Mark White, technology principal, Deloitte Consulting LLC
  - Mark Hinds, managing director, dunnhumby
  - Max Jolly, global head of digital personalisation, dunnhumby
  - David Boyle, senior vice-president, consumer insight, EMI Group
  - Ash Mahmud, head of CRM, Groupon
  - Richard Merkin, CEO, Heritage Provider Network
  - James Gosling, chief software architect, Liquid Robotics
  - Michael Driscoll, CEO, Metamarkets
  - Gareth Price, head of new business, NEC Europe
  - Richard Brath, partner, Oculus
  - Edd Dumbill, chairman, O'Reilly Strata Conference
  - Andreas Wiengend, director, Social Data Lab
  - Albert Azout, CEO, Sociocast
  - Sean Gourley, data scientist, Quid

We would like to thank all interviewees and survey respondents for their time and insight.

The report was written by Jim Giles and edited by Gilda Stahl. Mike Kenny was responsible for the layout. ■

## Executive summary

The business landscape is being shaped by data as never before. The sheer magnitude of data being produced is staggering. According to Eric Schmidt, Google's chief executive officer<sup>1</sup>, the world creates 5 exabytes of data every two days. That is roughly the same amount created between the dawn of civilisation and 2003.

When the Economist Intelligence Unit surveyed executives for the first report in this series, *Big data: harnessing a game-changing asset*, published in 2011, almost one-half of our respondents said that data had become an important factor for their business. And nearly 10% said that data had completely changed the way their company worked. But the report also found that many companies struggle with basic aspects of data management and with their attempts to exploit their data effectively. It would seem that the next step in the big data journey is for companies to discover how they can extract value from the data they gather.

During the first half of 2012, the Economist Intelligence Unit sought insight on this issue and more. In a survey sponsored by SAS, 752 senior executives from a broad range of sectors and countries shared their thoughts on the world of data. In parallel, interviews were conducted with 17 executives, consultants and specialists who are regarded as data pioneers. Highlights of the research are as follows:

- **There is a strong link between financial performance and effective use of big data.** Many companies are aware of the power of big data, but are not yet fully exploiting the data they collect. The survey findings suggest that they should not delay. Top-performing companies—dubbed “strategic data managers” in our previous report—process data more rapidly and see the rewards of doing so across functional areas. They also place a higher premium on data than do their peers, collect more of the data available outside of their organisation and use them more broadly across the business.
- **Companies become successful at exploiting data by focusing on business priorities.** It is tempting to think that technology can transform a business. It can, but companies need first to recognise the problem they want to solve. Big data can only work its magic if a business puts a well-defined data strategy in place before it starts collecting and processing information. And that strategy should be based on key business priorities; the data component is developed afterwards, with the aim of serving those priorities.

The importance of strategy is also a theme of the survey results. Forty-six per cent of executives from companies that significantly outperform their peers financially say they have a well-defined data strategy, more than

1. <http://techcrunch.com/2010/08/04/schmidt-data/>.

four times the figure for those on par with their peers.

### ● **Talent matters as much as technology.**

Executives need to ensure that analytic thinking is not confined to the IT department. Managers across all parts of an organisation should be thinking about how data can improve performance and, with the help of data experts, transforming those thoughts into actions.

This requires more than knowledge of computer programming and statistics. Data professionals are now required to understand a company's priorities and competitive environment, so that they can exploit data to answer the right questions. Finding such people is not easy: 41% of survey respondents say that a lack of skilled staff hampers their attempts to process data more rapidly.

- **Social media analytics and web-tracking technologies can transform the way businesses collect data about customers.** The impact of big data is felt across almost all functional areas. But according to interviewees, some of the biggest gains are being seen in customer-facing areas. Loyalty cards—which businesses use to collect fine-grained data on customer preferences—have already led to significant changes in retail and entertainment. Data from web-tracking technologies and the analysis of user-generated content on social networks are becoming similarly important. Nearly two-thirds of companies surveyed (66%) are already collecting web data. When used effectively, customer data can lead to dramatic improvements in loyalty, as well as more effective methods for enticing customers away from rivals. ■

# Introduction

A decade ago, few companies would have considered appointing a chief data officer. Now the position is commonplace in the US. Over the same period, the rise of Facebook (which has close to a billion users) and other social media has led to an explosion in “unstructured” data, such as comments and opinions posted by customers that can provide insights into how a company is viewed. Older technologies, such as e-mail, continue to produce a stream of data. Add data from newer sources, including radio-frequency identification (RFID) tags and other low-cost sensors, and the flow becomes a torrent.

If used effectively, big data can be a powerful tool. Last year’s report identified a strong link between effective data management strategy and financial performance, a finding confirmed by the present survey. Nearly one-half of respondents from companies described as significantly ahead of their peers in financial terms said that their organisation has a well-defined data strategy, more than four times the figure for respondents who said they are on par with their peers. These companies are also more likely to have made greater advances in the speed at which they can process data and to report seeing data improve the performance of many different organisational functions.

Many are well advanced on their data journey. Asked how long they had been working with big data, 57% of survey respondents said that they had been doing so for at least three years. Companies in some sectors—financial services is one

example—are expected to be seasoned data users. But the survey reveals deep experience among respondents from industries such as manufacturing as well. “A business running without accurate data is running blind,” says Ash Mahmud, head of CRM at Groupon, a website that distributes discount offers.

These results are backed up by case studies of companies that have used data to gain a competitive edge. Tesco, a UK multinational grocery that is the world’s third-largest retail chain and 59th on the *Fortune* Global 500 list, has been lauded for its loyalty card programme, which it uses to better understand shoppers. Casinos have used similar schemes to probe customer behaviour, and insurers now routinely analyse large datasets in order to root out fraud and set prices.

More recently, companies have begun mining Facebook and other social networks for unstructured data. And the impact of big data is being felt beyond marketing departments: survey respondents say that data are improving company performance across many areas, with strategic decision-making and operational efficiency highlighted most frequently

Yet the evidence for the power of big data can obscure the difficulties that many companies face when working with it. In our previous report, just over one in five respondents rated the challenge of reconciling disparate data sources as “very problematic”. Almost one-third said that they did not have the right skills in the organisation to

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A business  
running without  
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”

Ash Mahmud, Head of CRM,  
Groupon

manage data effectively and close to one-quarter said that vast quantities of data go untapped.

How can companies make best use of the data they collect? As the survey results and case studies in this report reveal, many companies will thrive if they place big data at the heart of their business, giving it the strategic attention it deserves. Organisations also need to ensure that

employees have the right skills to make sense of the data they collect. These are not easy objectives. But the following lessons from leading data-driven thinkers make one thing clear: if a company can work out how to harness them, the data torrents that are shaping the business landscape can be powerful drivers of innovation and revenue. ■

# 1

## Data and the bottom line

When the Economist Intelligence Unit polled executives from around the world and across different sectors, we found that companies that significantly outperform their peers are more likely to collect—or plan to collect—every kind of data that the survey asked about, from data generated by RFID tags to those from web-tracking technologies. And it is not just Internet companies and retailers that are using big data: executives from a diverse range of sectors, including education and public services, say that their organisation plans to or is already collecting many types of data.

High-performing companies are also more in touch with data than their less-successful rivals. When asked about marketing and communications, for example, 59% of executives from leading

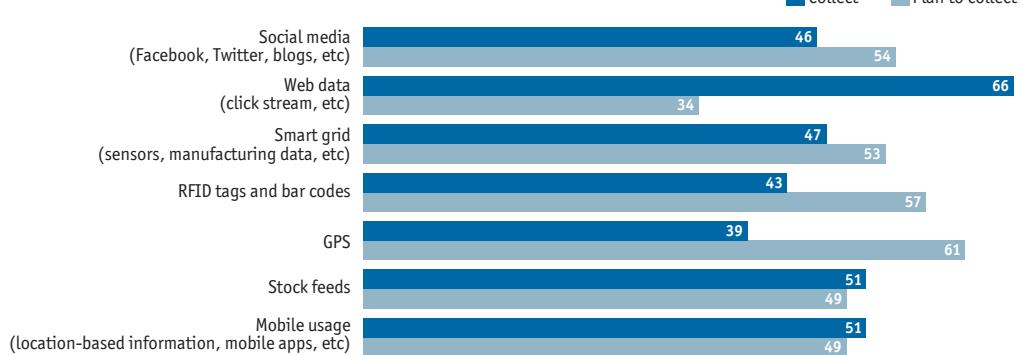
companies said that data were “extremely important” to that area of their business compared with 39% from other companies. In fact, executives at these companies were more likely to attach an “extremely important” rating to data use in all the business areas that the survey asked about, from strategic decision-making to human resources.

What about the technology itself? Are companies that are ahead of their peers able to analyse data more rapidly, for example? Again the answer is “yes”. Forty percent of executives from high-performing companies said that the speed at which their organisation processes data has increased significantly over the past 12 months, compared with 17% from other companies. And that speed is producing dividends. In all the business areas covered by the survey, high-

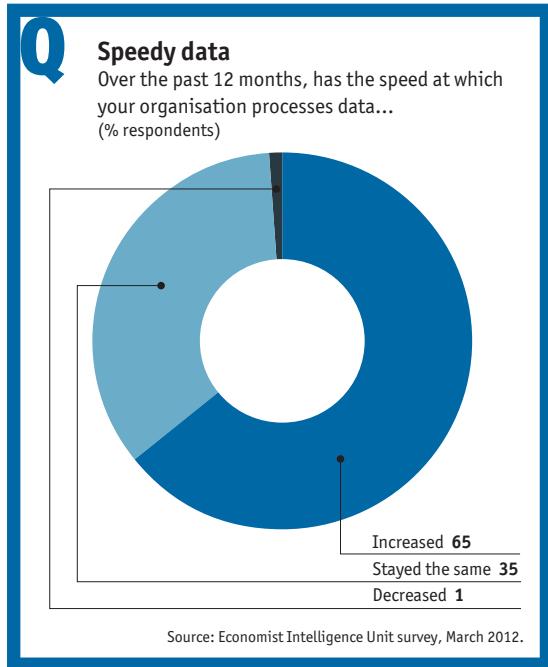
**Q**

### Data collection

Which of the following sources of data does your organisation collect or plan to collect?  
(% respondents)



Source: Economist Intelligence Unit survey, March 2012.



“

Being able to do things in real time makes people think differently about the problem.

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Andreas Wiengend, Director,  
Social Data Lab

performing companies were more likely to report seeing benefits from more rapid processing than their less-successful rivals. The greatest impact is being felt in strategic decision-making, where 63% of executives at these companies say that faster processing is having an impact.

Rapid processing can also enhance creative thinking, says Andreas Wiengend, director of the Social Data Lab. He notes that in experiments with large datasets, data scientists—that is, individuals who excel at analysing large amounts of data—often run through hundreds of iterations in order to test different theories about patterns within the data. That experimentation is much more fluid when such tests are run on hardware and software that can return results within seconds. “Being able to do things in real time makes people think differently about the problem,” says Mr Wiengend. ■

# 2

## Putting strategy first

Even seasoned data professionals can find the world of big data overwhelming. A company might be collecting market research interviews, a stream of information from social networks, supply chain data and sales figures from multiple sites. Which source is the most important? And how can they be combined to maximum effect?

For executives pondering these issues, a word of caution: they may be the wrong questions to be asking. Edd Dumbill chairs the O'Reilly Strata Conference, a leading big data event. He says that many executives believe that the right technology can produce "magical results". But companies should start by prioritising the challenges they want to tackle, and then build an appropriate data strategy around those objectives. "You need to know what problem you want to solve," says Mr Dumbill.

As we will see later in the report, the range of challenges that can be tackled with big data is incredibly varied. Music companies are using data to fine-tune their marketing campaigns; casinos leverage data to poach customers from their rivals. But whatever the target, companies should start by agreeing on a focus and, with that focus in place, prioritise, manage and process data accordingly.

Companies lacking a focused data strategy are likely to suffer. When the Economist Intelligence Unit asked companies about their approach to data management, less than one in five said that they had "a well-defined data management strategy that focuses resources on collecting and analysing

the most valuable data". Yet the response varied markedly by financial performance. Almost one-half of high-performing companies described their strategy as "well defined" compared with an average of less than 15% in under-performing companies.

For the strategy to be effective, it usually needs to come from the very top of the organisation. In 1998, Harrah's Entertainment, a casino company, recruited Gary Loveman, then an associate professor at Harvard Business School. Mr Loveman was asked to put data at the heart of the organisation, a decision that amounted to a big cultural shift for the company. "Fortunately, when I started this I was chief operating officer," says Mr Loveman. "I was able to almost oblige people to go along. It is not something that you can lead from a position of limited influence." Having that influence paid off: Mr Loveman is now chief executive officer of the company, since renamed Caesars Entertainment and currently the third-largest casino organisation in the world. He credits his strategy with helping the organisation to expand to 14 different US states.

Top-down pressure is often required in part because data issues tend to cut across traditional departmental boundaries. "It is very, very common to find data in disparate silos inside organisations, with a strong degree of territorial or technical boundaries around the data," says Mr Dumbill. To implement an effective strategy, staff may need to cede territory, which often requires

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Edd Dumbill, Chairman, O'Reilly Strata Conference

## EMI Music: data-driven marketing

In 2011, managers at EMI Music spotted something interesting. It concerned one of their new artists who boasted a strong following among young people, but little recognition in other demographic groups. EMI observed that other music fans were starting to take notice of the artist. Eventually, the company's research showed that the artist had gained recognition among casual consumers, that is, those who listen to and watch mainstream radio and television. At that point EMI decided to back the artist with a major marketing campaign. It was subsequently rewarded with a number-one hit.

This kind of data-driven process is typical of the way that EMI operates, says David Boyle, the company's senior vice-president for consumer insight. Decisions about how to market artists used to be made by managers with a deep knowledge of the industry but little data to draw on. Now those same managers can dive into EMI's sizeable data holdings when making a decision on whom to promote.

At the heart of the process is a dataset that now contains over a million consumer interviews conducted in 25 countries over the past few years. Each interview generates around 100 pieces of

data, covering everything from the interviewee's reaction to new music to the supermarkets where the interviewee shops. "We have thousands and thousands of data points on any artist," says Mr Boyle.

The interview results are bolstered by a stream of data that flow in from Spotify, a music-streaming service with a library of 15m tracks and 3m paying users. Spotify provides EMI and other labels with anonymised data on every track that a user listens to, providing the kind of fine-grained insight into listening habits that would have been unimaginable before the Internet.

EMI managers combine data from the interviews and Spotify to track an artist's popularity among different demographic groups. They target their marketing spend accordingly. If an artist shows signs of attracting attention among an untapped group of consumers, managers may try to place the artist on radio and television shows that are popular with that demographic. Or, if the potential is big enough, they might launch a television advertising campaign. "In the last few years EMI has gone from a business where this kind of approach was slightly feared to one where data are used to help do almost everything we do," says Mr Boyle. ■

pressure from the C-suite.

There is no one-size-fits-all solution, but data experts say that company priorities, not the technology itself, should dictate the course of action. The importance of strategy can be seen in the survey results. Twenty-nine per cent of companies that described their performance as

"significantly ahead of peers" said that they had a well-defined strategy for using the cloud; the figure for companies that lag behind their peers is 11%. The gulf is even greater for smart system strategies: over one-third of high-performing companies have a well-defined strategy in this area compared with around 5% of under-performing companies. ■

## Data democratisation at dunnhumby

Having invested time and money collecting them, few companies want to share data with other businesses. Yet sharing data with others is exactly what experts at dunnhumby, a multinational brand retail consultancy, recommend. It is advice that should be taken seriously, as dunnhumby has an excellent track record when it comes to big data. In the 1990s the firm promoted the idea that data from loyalty cards could be used to better understand customers. Tesco—one of the firm's clients—liked dunnhumby's work so much that it bought a stake in the company.

"We talk about the idea of democratising the data," says Mark Hinds, one of the company's managing directors. Mr Hinds gives the example of a retailer that carries brand products as well as alternatives that it manufactures itself. Even though the products compete for sales, Mr Hinds says that the retailer should share all the relevant sales data with the brand manufacturer, not just the figures on sales of that manufacturer's product.

That is partly because sharing spurs innovation. A better understanding of the customer will help the brand manufacturer create new products that will boost the retailer's bottom line. Mr Hinds says he has seen that happen at Kroger, the largest grocery chain in the US and a *Fortune* 100 company, with which dunnhumby works. "I think Kroger didn't historically share own-label information with manufacturers, but we said that every product affects the shopping trip," says Mr Hinds. "Therefore every product needs to be exposed to a customer lens, and if somebody can produce a similar product with higher quality, they should be able to."

The data democratisation concept can make companies nervous and so may require buy-in from senior executives. But it is worth it, says Mr Hinds: "I think the culture shift starts by saying, 'first and foremost, we want to give customers a fantastic shopping trip.' Manufacturers that have fantastic capability need to be brought into that." ■

## Data for secondary markets

Many companies build a big data strategy with the aim of improving their existing lines of business. Yet sometimes those plans should extend to encompass completely new revenue streams, notes Gareth Price, head of new business strategy at the European division of NEC, a Japanese technology giant.

Take the example of a company that operates a vehicle fleet, such as a taxi firm or a delivery business. The company might install global positioning systems (GPS) and other reporting devices in each vehicle so that it can track its operations. As a by-product, it now has reams of data on vehicle movements, accidents and road conditions. Might these data find another use?

Absolutely, agrees Mr Price. Insurance

companies could use these data to assess the risk associated with different roads. Companies that offer navigation services, like Google and TomTom, can use tracking data to determine the quickest route between two locations at different times of day. Government transport planners might use them for planning purposes.

Mr Price predicts that these "secondary markets" will become increasingly important. He advises NEC clients to build systems that can export big data in a form that others can use, because you never know who might be willing to pay for them. He also notes that before publishing data to the secondary market, enterprises should share them with key business partners first—ideally via the cloud. ■

## 3

## Talent, not just technology

**Companies need to ensure that data-driven thinking is not confined to the IT department.**

It is easy to be seduced by the technological wizardry that surrounds big data. Many companies can now afford computers with processing speeds and storage capacities that, just a few years ago, would have been available only to those with the deepest pockets. Armed with these machines and software, data scientists can run sophisticated analyses with the potential to affect everything from the efficiency of a company's supply chain to the return it garners on advertising spend.

However, interviewees for this report had words of caution for anyone dazzled by the power of this technology: people matter as well. Even simple analyses can prove powerful in the hands of data experts with a deep understanding of their companies' aims. "One of the things that we have understood over time is you do not necessarily get this bit of data and it gives you the answer," says Max Jolly, global head of digital personalisation

at dunnhumby, a retail consultancy. "It is about how you use data and add a layer of interpretation to it in order to get to the answer that you are looking for."

Take speed as an example. Hardware manufacturers often promote the processing speed of their products. At many organisations, however, it is people, not machines, who create a bottleneck between data and decisions. When asked to list the challenges involved in processing data more rapidly, 41% of respondents cited a lack of the right skills in their organisation, more than any other answer. The reason was even widely cited by executives working in sectors where technical skills are essential, such as IT and financial services.

Recruiting the right people is not always easy, of course. Skilled data scientists are in short supply and high demand. "This sophisticated kind of large data analytic work requires people who are not



## What's in an algorithm?

To create a data-driven organisation, executives will often have to win over employees with little or no knowledge of data science. Many will even be unfamiliar with the term "algorithm". What can be done to convince employees of the power of big data?

Piyanka Jain likes to start with a group exercise. Ms Jain is president and CEO of Aryng, a San Francisco-based company that provides data analytics training and consulting. When working with a new company, she splits employees into groups and gives each a data task that can not be easily performed using Google, such as determining the number of billboards in San Francisco. The answers typically vary widely. Then she runs through a simple analytical framework and gives the groups another similar problem. Armed with a proper method, the groups usually produce very similar answers. The data sets may be big or small, but the exercise helps employees appreciate how data and data processing can answer questions more accurately, and ultimately drive better decision-making.

To make that second point, Ms Jain runs employees through a five-step process that guides them from data to decisions. One of her case studies for the process focuses on an Oregon wedding

only capable, but desirous of this kind of work. There is a fairly limited category of professionals who get up in the morning wanting to go to work and do this kind of thing," says Mr Loveman of Ceasars Entertainment.

The right person will possess knowledge of the sector in which that person's company operates, as well as the skills required to work with large data sets. In many sectors it is hard to find someone with both skill sets, say Mark White, a technology principal at Deloitte Consulting LLC. He says that companies in this situation should search academic departments or, in the case of smaller organisations, consider sharing a data scientist via a trade body.

Companies also need to ensure that data-driven thinking is not confined to the IT department. Mr

venue that sought to derive the most value from its modest advertising budget. Ms Jain first sat down with the winery owners and boiled the problem down to its roots, which in this case turned out to be the need to identify Internet sites that provide a good return on advertising spend.

With the question identified, Ms Jain moved to step two: the creation of a data-gathering plan that focused on the frequency with which visitors to the venue's website ended up making a booking. When the data came in (step three), she ran a statistical analysis (step four) to determine which referring sites provided the best return on investment (ROI). The final step—a series of recommendations based on the results of the data and the statistical analysis—helped the venue increase its revenue by 10%, with no additional advertising spend.

Ms Jain contrasts her focused approach with the more exploratory techniques that others use when working with big data. The latter are like Christopher Columbus, a man who set out to see what he could find. Ms Jain's approach is more akin to Sherlock Holmes, an investigator who sought the answers to specific questions. "The exploratory approach is cool and fun, but it is not effective, efficient analytics," says Ms Jain. "It will not necessarily get you results back." ■

2. <http://phx.corporate-ir.net/phoenix.zhtml?c=176060&p=irol-newsArticle&ID=1654832&highlight=>

Wiengend of the Social Data Lab—an organisation that connects data professionals in academia and business—says that at Amazon, his former employer, staff throughout the company routinely run experiments to test the impact of changes to things like marketing strategies and recommendation systems. Amazon is now so large—it had sales of US\$48bn in 2011<sup>2</sup>—that staff there are sometimes able to monitor the impact of even tiny changes, such as a tweak to the font used in an offer, within minutes of making the change.

Companies should also think hard about how to communicate the results they derive from their data work to employees with different needs and different levels of expertise, says Max Gadney, founder of After the Flood, a company that helps



organisations communicate data to their customers and clients. "Who is the audience? That is the first thing," says Mr Gadney. "Whose needs are different and how are most of those needs being met?" The CEO might need a monthly report that summarises

what the company's data scientists have learned, which will be very different from the technical charts that those scientists peruse. With the right communication, says Mr Gadney, people can be empowered by big data: "It is not about oppressing

## Drowning in data

The data that stream in from stock exchanges and payments processors are an orderly series of prices and timestamps. In small doses at least, the figures are relatively easy to understand. Other data sources are not as structured or easy to process. They may, however, be just as powerful.

News articles are one such source. Some large news websites now publish more than 1,000 articles a day. The days when executives could learn all they needed to know from a single morning paper are long gone. Most news stories will not be especially useful to any given company; when combined, however, national and international news outputs contain hints of threats and opportunities across almost every business sector. So how can companies extract actionable intelligence from this deluge of news data?

One approach is to use a software tool that helps analysts to organise and extract meanings from large sets of documents. In a visual analytics competition run last year, the Institute of Electrical and Electronic Engineers (IEEE) challenged entrants to analyse a set of around 4,400 news reports, some of which concerned the fictional town of Vastopolis. Entrants took the role of a national security analyst who was asked to examine the reports for evidence of imminent terrorist activity.

nSpace2, a web-based tool developed by Oculus, a data visualisation company, was one of the winners. The software enabled the Oculus analyst to identify and organise documents

with relevant keywords, create timelines of relevant events and assign confidence levels to different hypotheses about future events. After 14 hours of work, the analyst was able to develop formal conclusions based on a sequence of events, including a burglary at a biology laboratory and an outbreak of influenza, which pointed to an ongoing bioterrorism attack.

Four thousand plus news stories is a sizeable data set, but small compared with the number of reports that a company may want to consider over a period of years. For these bigger challenges, a more automated approach is required, like the one being pioneered at Recorded Future. The company continually scans tens of thousands of information sources, from news outlets and blogs to trade publications and government websites. Then it takes this vast trove of unstructured information and extracts data that can be more easily processed, such as information on the people and organisations mentioned in the reports, as well as the relationships between them.

With the data organised in a more manageable way, Recorded Future can generate actionable intelligence. It becomes easy, for example, to list all organisations that are considered to be rivals of a company. The system can then check for forthcoming product launches, hints of expansion plans or legal threats facing those rivals. By drawing on studies of similar events from the past, Recorded Future can even forecast the impact that an event such as a product launch is likely to have on the markets. ■

people and making them do stuff that is not natural to them. It is about enabling decision-making.”

It is also worth remembering that no matter how skilled your staff, there are many smart people who do not work for you. Thanks to the Internet, it can be relatively easy to tap into this pool of external talent. The Heritage Provider Network (HPN), a physician group that develops healthcare delivery networks throughout the US, is currently offering a US\$3m prize to the data scientist who can come up

with the best method for using health claims data to predict which patients will be admitted to hospital within the next year. “If you can identify people that are at a high risk, you could intercede early,” says Richard Merkin, president and CEO of the network. In return for funding the competition, which is organised by Kaggle, a company that says it is “making data science a sport”, the network receives exclusive and perpetual rights to use the methods developed by all of the entrants. ■

# 4

## Discovering what your customers *really* think

Data can do many things for a company. A data-driven approach has helped some organisations improve the efficiency of their supply chains. Others use big data to guide marketing efforts. Yet data are more useful to some departments than others. When the Economist Intelligence Unit asked executives to rate the value of data to different parts of their organisation, marketing and communications emerged as one of the most important uses. Seventy-three per cent of respondents rated data as "important" or "extremely important" to this function.

Why so? Part of the answer is that good marketing and communications requires a solid understanding of a company's customers. Prior to the Internet, this understanding was neither easy

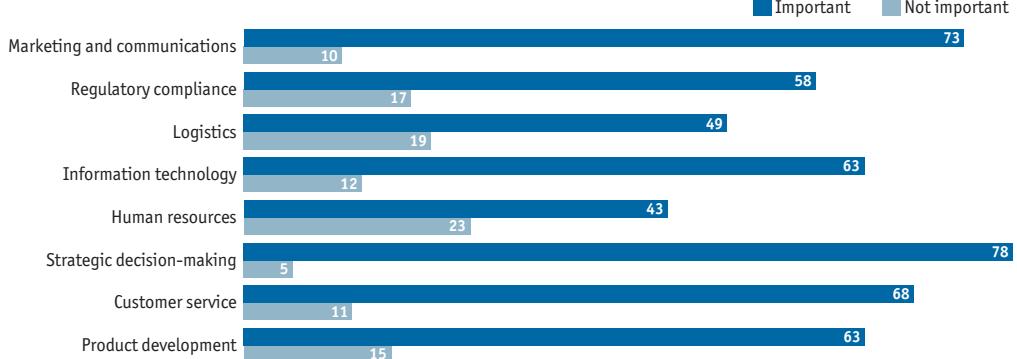
nor cheap to acquire. Now companies can learn about customers by tracking their movements across the web, by distributing low-cost surveys quickly online and by monitoring the thoughts and feelings expressed on social networks. Customer loyalty schemes, now standard in many industries, provide another source of insight.

The full potential of this newly acquired knowledge is only just beginning to be exploited. Data experts say that a better understanding of customers can provide the springboard for new forms of innovation. Rather than thinking about innovation in the context of acquiring customers by creating new and better products, companies can use big data to spur innovative thinking about the customer experience. And a better experience

### Q

#### Which departments benefit?

Please indicate the importance of data for the following parts of your organisation.  
(% respondents)



Source: Economist Intelligence Unit survey, March 2012.

for customers will often translate into a more profitable experience for the company with which they do business.

This approach has transformed large retailers over the past decade. "You start from the customer," says Mr Hinds of dunnhumby. "A lot of times when we do that, the company strategy is fundamentally wrong. Often you will have people say, 'We do a great job of serving our existing customers. We just need more customers.' But we take the information and segment it based on the customer's loyalty to the particular organisation and match it to third-party data to understand what share they are getting. Often you can show them that they are only getting 40% of their most loyal customers' total spend."

Once a company understands this, it can use data to improve loyalty. A retailer might send

customers coupons for a product they buy regularly. Or if an organisation notices that a particular store attracts much traffic just before closing time, it might extend opening hours to make shopping more convenient. The data, says Mr Hinds, help consultants like him to say: "You could more than double your business from your existing customers. That belief that you are already meeting all the needs of your customers is simply untrue."

At Caesars Entertainment, Mr Loveman used a loyalty card scheme and the data it produces as a response to the competitive nature of the casino industry, where a gambler can leave one venue, walk a few yards and play an identical game at a rival establishment. "So you are going to have to build your strategy around the purchaser, not the product," says Mr Loveman.

To promote loyalty, card holders receive free

## You are what you click

Two-thirds of executives surveyed by the Economist Intelligence Unit said that their company already collects data on the websites that its customers frequent. This kind of tracking raises concerns about privacy, but if these can be managed, it will become an increasingly important method for understanding customers.

At the most basic level, web-tracking works by drawing a connection between the websites a person visits and his or her interests. Take a user from Los Angeles who browses baseball reports and then checks ticket prices at the San Francisco Giants website. There is a good chance that person is planning to take in a game in San Francisco. An advertising company that has tracked this browsing behaviour can use the information to serve up notices for hotels and attractions in San Francisco, as well as options for travelling to the city.

Many companies are now competing to draw more nuanced inferences from studying the massive amounts of data available on browsing habits. The complexity of this task, which involves working with data on the daily browsing habits of millions of people, has drawn in PhD-level data scientists and spurred collaboration with academic groups.

Sociocast, an organisation that helps companies work with web data, counts among its advisers the physicist Albert-László Barabási, a professor at Northeastern University with a string of papers in *Nature* and *Science* to his name. Sociocast is taking Mr

Barabási's ground-breaking work on patterns in human mobility and adapting it to the business of predicting the services and goods that people want to buy.

The company starts with standard tracking data, which include a list of websites that each person visited, the terms they searched on while at those sites and the ads they clicked on. Like many rival companies, Sociocast runs software that makes inferences about a person's interests by examining the content of the sites that person visits. But Sociocast is trying to distinguish itself from the competition by using methods developed by Mr Barabási and colleagues to analyse data on another variable: time.

"Other models will see a user, and they will say, 'Well, that user has visited an automobile site 16 times. This person is most likely an auto buyer,'" says Albert Azout, chief executive officer of Sociocast. "But what we actually found in our research, when we were looking at the billions of behaviours online, was that the order in which someone does something is more predictive."

Mr Azout gives the example of someone who purchases a briefcase online and visits a job-hunting website. The person appears to be in the market for a new job and so might be a good target for an advertisement for a rival job site. But that inference applies only if the person bought the briefcase before visiting the job site. If the individual made the purchase afterward, the logic is reversed: the person may have just accepted an offer of employment and so would be a bad target for a job website. ■

## Market research via social media

What are your customers saying about your company and its products? You might not be hearing the truth through traditional means. A formal survey might not tap into what a customer truly believes. A focus group could do so, but the process is time consuming and expensive to scale up.

But what if your customers were prepared to tell you what they honestly think, for free, and to post it on the Internet? That is the promise of market research that makes use of social media. Some products, particularly consumer products, are frequently discussed on Facebook, Twitter and other online platforms. And there are a lot of data on those platforms. Well over 300m tweets are sent every day<sup>3</sup>. Facebook's 900m monthly users expressed over 3bn opinions a day during the first quarter of 2012<sup>4</sup>. Analysts who collect and analyse these data can gain real insights into consumer sentiment, all without leaving their desk.

Does this sound too good to be true? There are indeed some caveats. Demographics is one. The population of Twitter and Facebook is skewed towards the young and relatively technologically savvy, so the opinions expressed there on, say,

the launch of a new car may not match those of the rest of the population. A description of a new product as "just what we need" might be a genuine endorsement or a sarcastic dismissal.

None of these problems is insurmountable, however. The populations of social networks are becoming more representative and, in the meantime, statisticians have methods for dealing with skewed samples. And while it is impossible to identify the sentiment of every tweet and Facebook message, there are many methods that do a passably good job. Artificial intelligence researchers have even developed preliminary techniques for identifying sarcasm.

Equally important, there are technology vendors that specialise in helping other organisations extract value from social media. They offer software packages that will track discussions about brands and products across all of the major social networks. The results are presented in easy-to-use formats—something that can be made use of even by an executive with an aversion to Facebook. ■

- 3. <http://blog.twitter.com/2012/03/twitter-turns-six.html>
- 4. <http://newsroom.fb.com/content/default.aspx?NewsAreaId=22>

meals and tickets to shows. In return, Caesars can learn a great deal about their gambling habits, which enables the company to craft more effective promotions. "What we did was to encourage our customers to share with us as much transactional information as possible," says Mr Loveman. "Then we built inferential models that predict how we could move them best from their current purchase behaviour to a more appealing pattern of purchase behaviour."

He gives the example of a 60-year-old woman who visits a Caesars casino near her home and briefly plays a US\$10 slot machine. Data from the Caesars loyalty scheme indicate that women of her

age who live near casinos are potential high-value customers. The choice of machine is also significant: novice gamblers rarely play US\$10 slots. To Mr Loveman, the data suggest that the woman gambles more regularly with a competitor and so should be made a marketing target.

The ability to use big data to create a better customer experience shows a strong connection with company performance, the survey results indicate. Only 22% of respondents say that data have made a significant contribution to improving the customer experience. However, the figure rises to 33% among companies that significantly outperform their peers. ■



### Getting to know you

Please indicate the extent to which data have contributed to your organisation's performance in customer service.  
(% respondents)

Significant contribution

Total respondents Significantly ahead of peers

22

33

Source: Economist Intelligence Unit survey, March 2012.

# 5

## Conclusion

The time when an executive could profess ignorance about the power of data has long passed. More than one-half of survey respondents say that their company has worked with big data for over three years. Every member of the C-suite should know that data matter, and that if that member's company is not exploiting data, a rival will gain a competitive edge by doing so.

Evidence of the advance of data is everywhere. A new breed of US graduates is leaving university with the aim of becoming data scientists—a job title that few had heard of just a decade ago. An ecosystem of data-focused companies is springing up. New data sources are emerging, as are innovative techniques for processing the information they produce.

The full impact of big data is still to come. Many data sets remain in organisational silos, cut off from a company. Organisations that lock up their data may fail to realise the benefits that may flow from sharing them internally, or from selling them to other companies. But this is a cultural problem, and as the power of data becomes more evident, it is likely to dissipate. We can expect the flow of information, already a powerful force, to become even transformative. Analysts at the McKinsey

Global Institute estimate that just one sector—the US healthcare industry—could create US\$300bn in value annually if it used big data to drive efficiency and quality<sup>5</sup>.

Will your company benefit? There is no reason why it should not. Our interviews with data professionals, together with our survey of executives, show how companies can learn from the leaders. A well-thought-out data strategy is essential, as is a focus on acquiring employees who can combine sophisticated data skills with a knowledge of the competitive landscape. This report also reveals how insights may flow from new kinds of data sources, including media reports and online comments.

If we had to combine these strands into a single take-away, it would be the phrase “data-driven thinking”. Almost all parts of a company need to be aware of what data can do. Managers throughout an organisation need to be thinking about data when they develop strategies, allocate resources and set goals. Because data-driven thinking has already reshaped industries and helped propel companies above rivals. It is already part of the fabric at some leading companies, and will soon be an essential ingredient in more success stories. ■

5. [http://www.mckinsey.com/insights/mgi/research/technology\\_and\\_innovation/big\\_data\\_the\\_next\\_frontier\\_for\\_innovation](http://www.mckinsey.com/insights/mgi/research/technology_and_innovation/big_data_the_next_frontier_for_innovation)

# Appendix: Survey results

Percentages may not add to 100% owing to rounding or the ability of respondents to choose multiple responses.

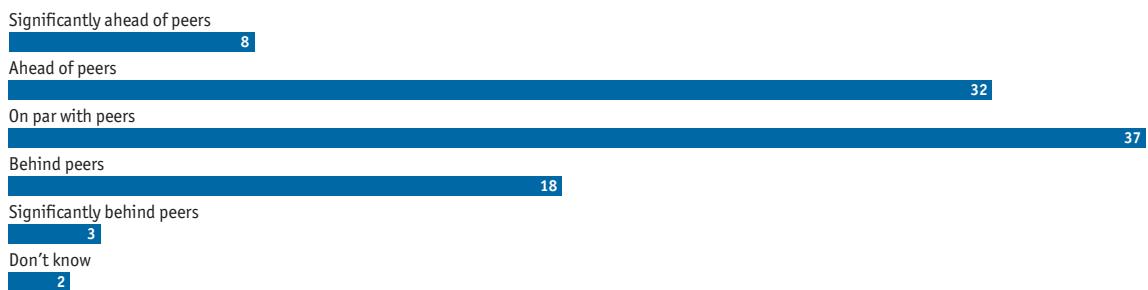
**How would you rate your organisation's financial performance in its most recent fiscal year compared with that of your competitors?** Select one.

(% respondents)

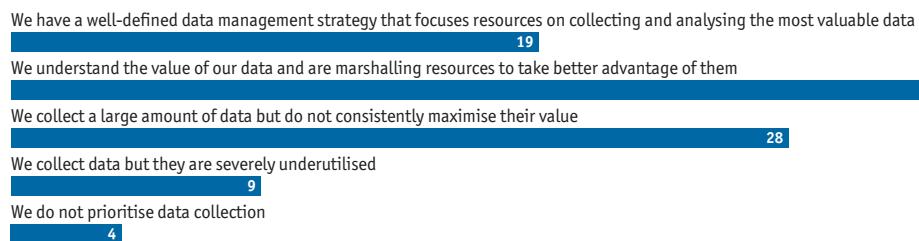


**How would you rate your organisation's use of data compared with that of your competitors?** Select one.

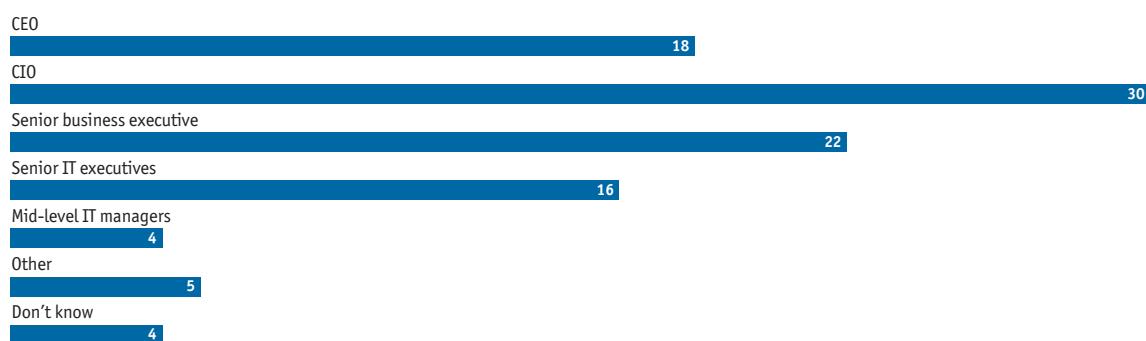
(% respondents)



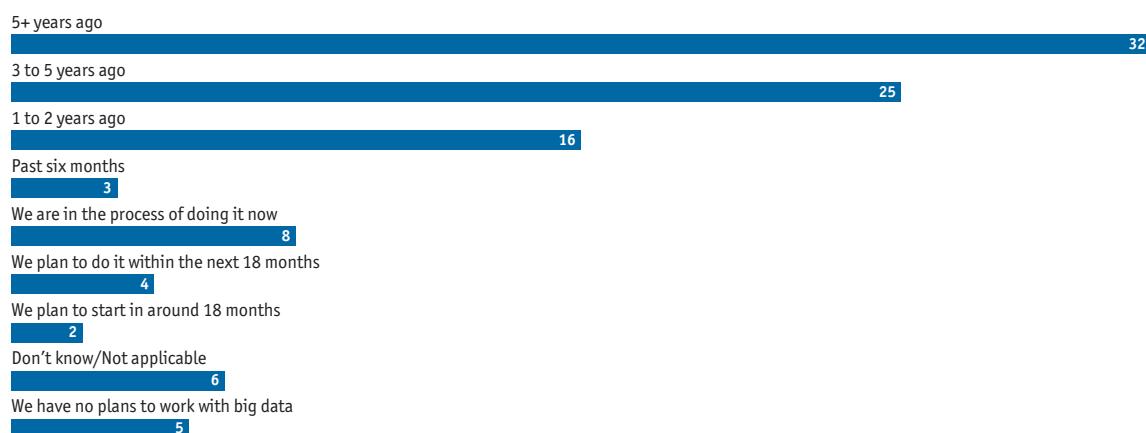
**Which of the following statements best describes your organisation's approach to data management?** Select one.  
(% respondents)



**Who is primarily responsible for your organisation's data management strategy?** Select one.  
(% respondents)



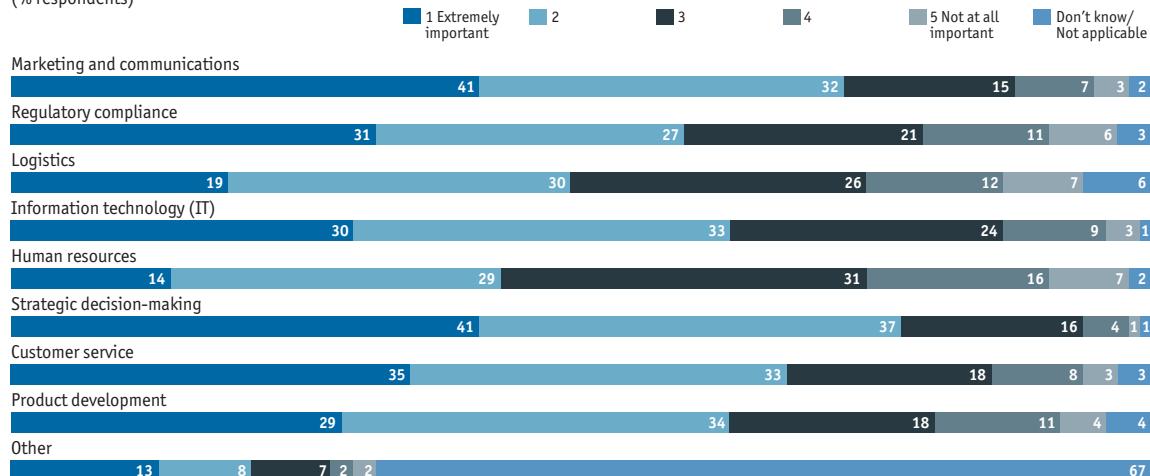
**When did your organisation begin working with big data?** Select one.  
(% respondents)



**Please indicate the importance of data for the following parts of your organisation.**

Rate on a scale from 1 to 5, where 1 = Extremely important and 5 = Not important.

(% respondents)



**In which of the following areas does your organisation possess the infrastructure needed to exploit the potential of your data?**

Select all that apply.

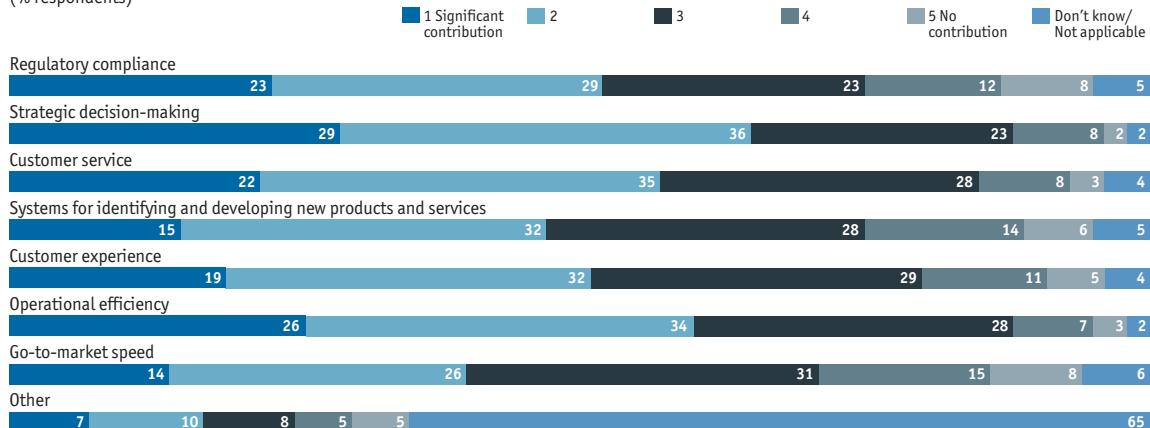
(% respondents)



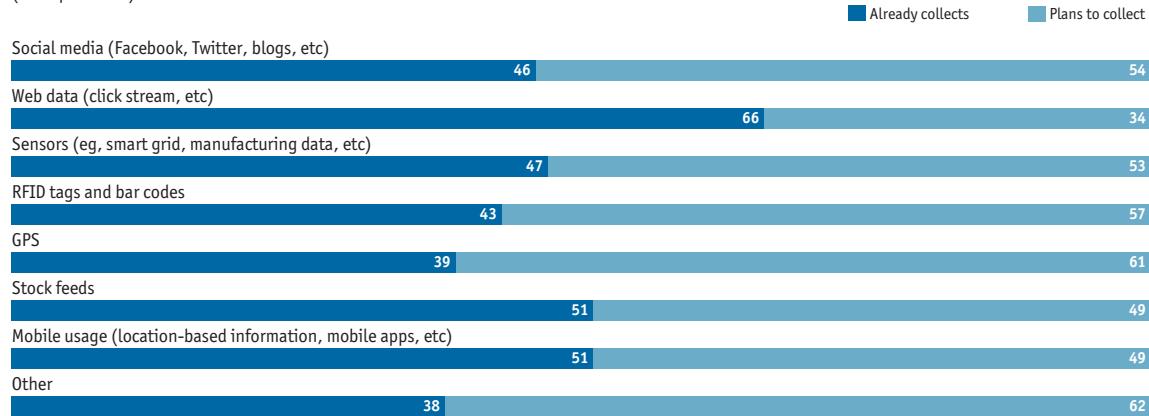
**Please indicate the extent to which data have contributed to your organisation's performance in the following areas.**

Rate on a scale of 1 to 5, where 1 = Significant contribution and 5 = No contribution.

(% respondents)



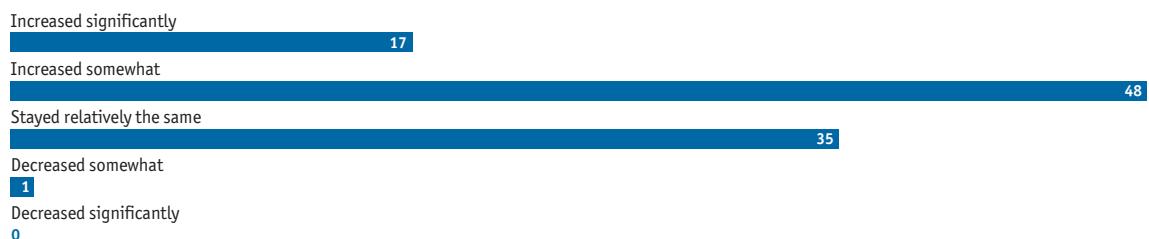
**Which of the following sources of data does your organisation collect, or plan to collect?**  
(% respondents)



**Over the past 12 months, has the speed at which your organisation processes data...**

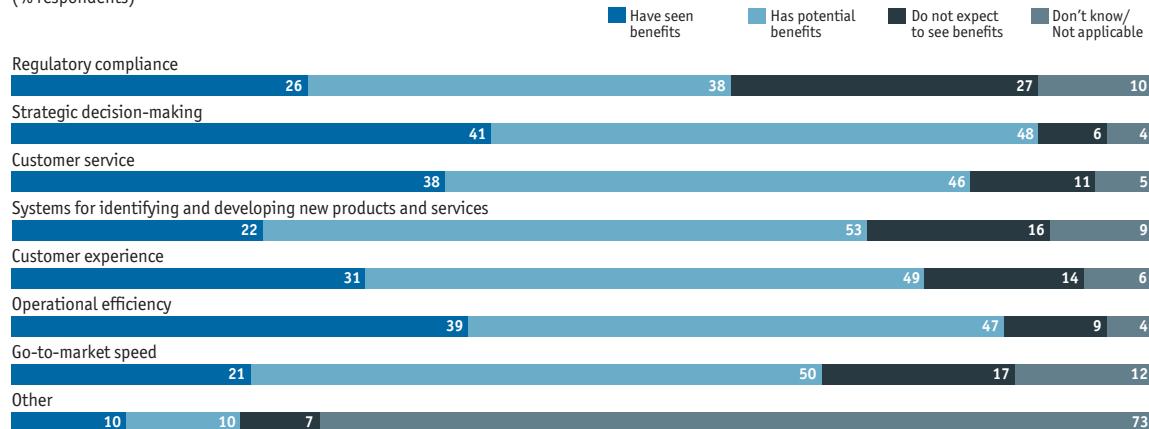
Select one.

(% respondents)



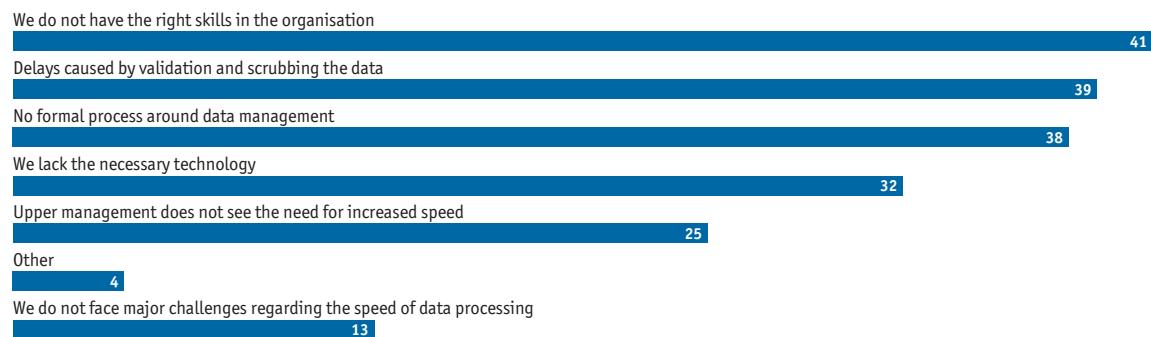
**Where has your organisation benefited from increases in the speed at which data can now be processed?  
Where could it see benefits?**

(% respondents)



**What key challenges, if any, does your organisation face when attempting to process data more rapidly?**

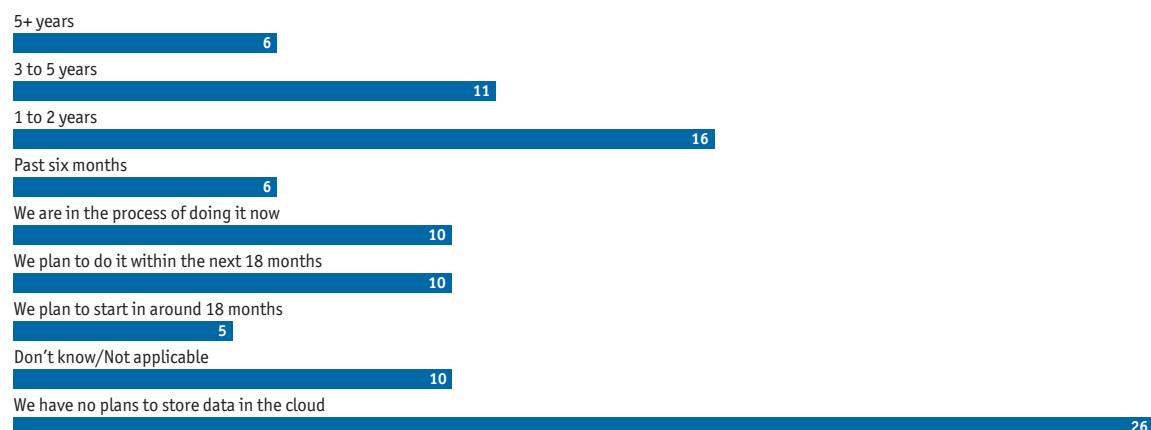
Select up to three.  
(% respondents)

**How important is the ability to process and act on data in real time to your organisation?**

Select one.  
(% respondents)

**If your organisation stores data in the cloud, how long has it been doing this?**

Select one.  
(% respondents)



**Which of the following statements best describes your organisation's approach to storing data in the cloud?**

Select one.

(% respondents)

We have a well-defined strategy that maximises the benefits of the cloud

13

We understand the value of the cloud and are starting to exploit it

35

We lack a unified cloud strategy and only some departments use cloud storage effectively

24

We do not believe that cloud storage offers us significant benefits

27

**Please indicate your level of agreement with the following statements.**

Rate on a scale of 1 to 5, where 1 = Strongly agree and 5 = Strongly disagree.

(% respondents)

<span style="background-color: #0070C0; border: 1px solid black; padding: 2px;"></span> 1 Strongly agree	<span style="background-color: #4682B4; border: 1px solid black; padding: 2px;"></span> 2	<span style="background-color: #3CB371; border: 1px solid black; padding: 2px;"></span> 3	<span style="background-color: #2F4F4F; border: 1px solid black; padding: 2px;"></span> 4	<span style="background-color: #A9A9A9; border: 1px solid black; padding: 2px;"></span> 5 Strongly disagree
--	---	---	---	---

Cost savings motivate our use of cloud strategy

21	28	28	12	11
----	----	----	----	----

Security concerns prevent us from fully exploiting the potential of the cloud

34	30	20	11	6
----	----	----	----	---

Regulatory concerns prevent us from fully exploiting the potential of the cloud

19	24	27	19	11
----	----	----	----	----

Cloud storage is attractive because employees can access data from remote locations

29	31	26	9	6
----	----	----	---	---

Use of cloud storage creates significant technical challenges for my organisation

17	28	31	15	9
----	----	----	----	---

Upper management does not appreciate the benefits of cloud storage

14	22	30	18	16
----	----	----	----	----

**Which of the following statements best describes your organisation's approach to smart systems?**

Select one.

(% respondents)

We have a well-defined strategy that maximises the benefits of smart systems

12

We understand the value of smart systems and are starting to exploit them

31

We lack a unified strategy for smart systems and only some departments use them

28

We do not believe that smart systems offer us significant benefits

29

**Where has your organisation benefitted from the data produced by smart systems? Where could it see benefits?**

(% respondents)

<span style="background-color: #0070C0; border: 1px solid black; padding: 2px;"></span> Have seen benefits	<span style="background-color: #4682B4; border: 1px solid black; padding: 2px;"></span> Has potential benefits	<span style="background-color: #3CB371; border: 1px solid black; padding: 2px;"></span> Do not expect to see benefits
--	--	---

Regulatory compliance

15	39	46
----	----	----

Strategic decision-making

20	42	37
----	----	----

Customer service

23	48	29
----	----	----

Systems for identifying and developing new products and services

15	47	38
----	----	----

Customer experience

20	48	32
----	----	----

Operational efficiency

28	47	25
----	----	----

Go-to-market speed

15	41	44
----	----	----

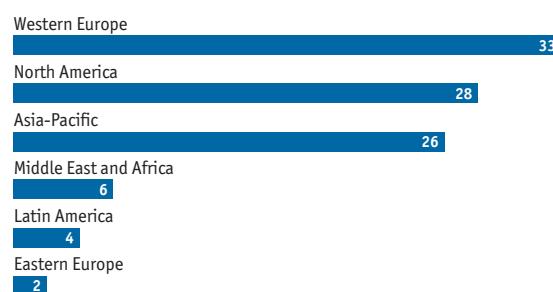
Other

4	22	74
---	----	----

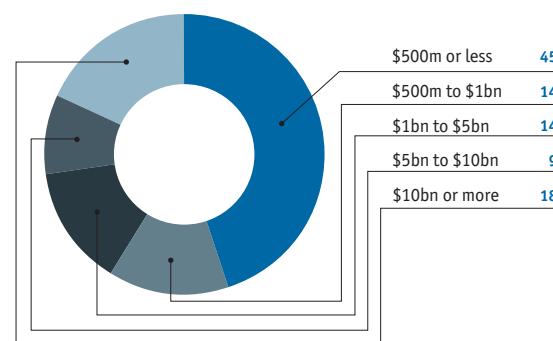
**In which country are you personally located?**  
(% respondents)



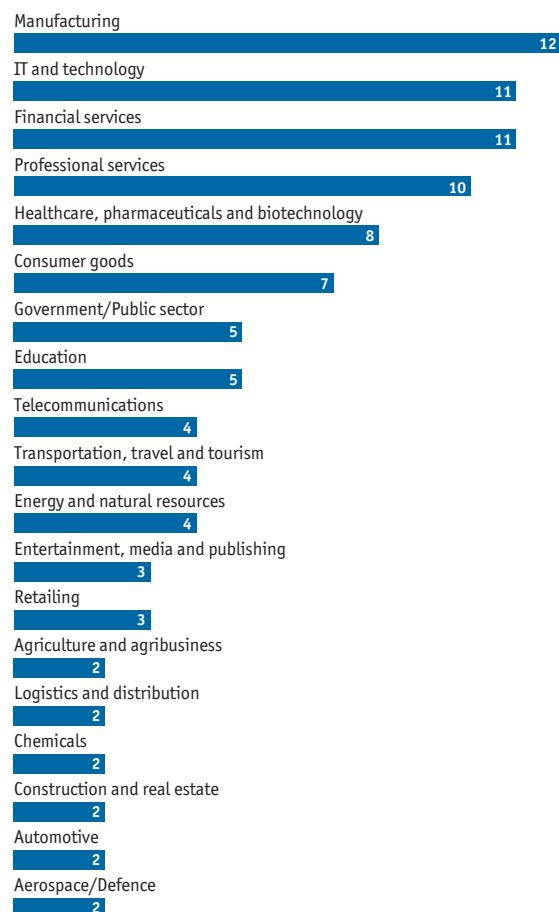
**In which region are you personally located?**  
(% respondents)



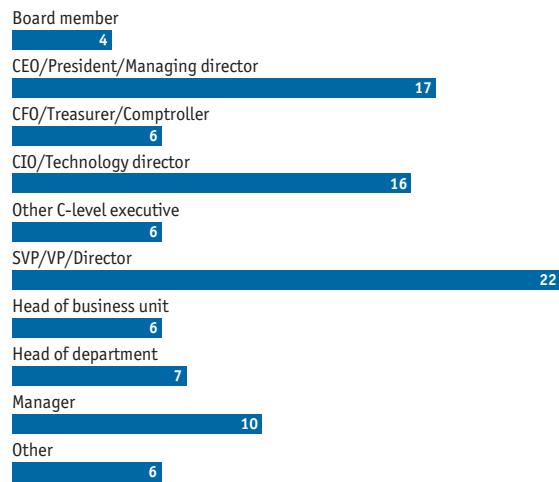
**What are your company's annual global revenues in US dollars?**  
(% respondents)



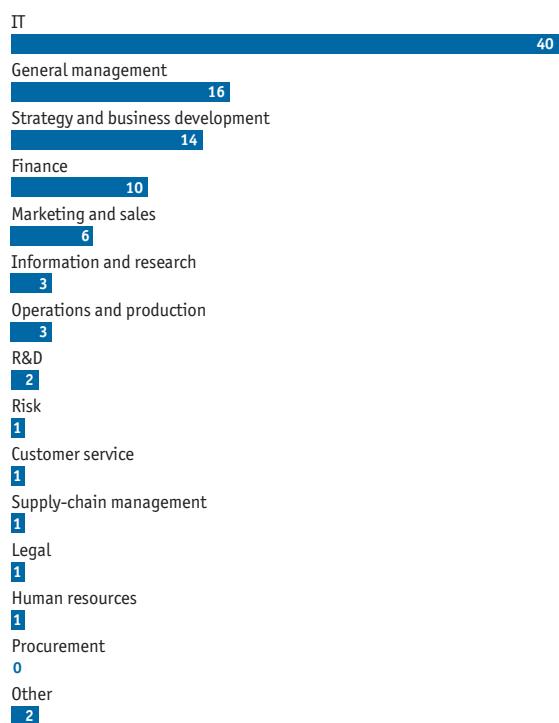
**What is your primary industry?**  
(% respondents)



**Which of the following best describes your title?**  
(% respondents)



**What is your main functional role?**  
(% respondents)



Whilst every effort has been taken to verify the accuracy of this information, neither The Economist Intelligence Unit Ltd. nor the sponsor of this report can accept any responsibility or liability for reliance by any person on this white paper or any of the information, opinions or conclusions set out in the white paper.

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