# CGMA® REPORT

## FROM INSIGHT TO IMPACT

Unlocking opportunities
in big data

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# EXECUTIVE SUMMARY

Data has become a key focus for corporate leaders today. It holds the potential to change the way business is done, in the view of nearly nine in ten (87%) of the finance professionals surveyed for this report. Other research highlights that just over half (51%) of corporate leaders now rank big data and analytics as a top ten corporate priority.[1] This is all part of a wider shift towards a data-driven era of business, building on the ongoing IT revolution of recent decades.

The volume and variety of data available for analysis is expanding exponentially. Meanwhile, increasingly powerful technologies have emerged to enable more sophisticated data management and analytics. The wealth of data sources available today is almost unlimited, and includes call-centre recordings, external data feeds, machine-generated data, customers' social media posts, and a huge amount more. These related trends – popularly summed up by the term 'big data' – are combining to enable today's organisations to unlock new sources of insight and value.

Inevitably, taking advantage of these opportunities with data will be challenging for companies, creating the need for new skills, tools and ways of thinking. So what does the data-driven era imply for business leaders, and finance professionals in particular? What benefits are being derived from new approaches to data analytics? And what role should management accountants seek to play in this area? These are some of the core questions that this report seeks to address. To do so, it draws on a programme of in-depth interviews, a survey of over 2,000 CFOs and finance professionals, and comprehensive desk research.

Some of our key conclusions include:

- **Data is becoming a core business asset.**
  Companies of all sizes and types are already generating material value from data in a range of ways. This spans all industries, with examples emerging from social media and internet companies, food and beverage companies, fast food chains, banks, manufacturers and hotels, among many others. Academic research reveals the scope for productivity gains on the back of data-driven decision-making. The finance professionals surveyed for this report agree, pointing to greater efficiencies and better KPIs as some of the benefits they expect from data.

- **Firms face a steep 'learning curve' in harnessing their data for commercial benefit.**
  For most companies, fully adapting to a data-driven era of business remains a work in progress. 86% of the finance professionals we surveyed agree that their businesses are struggling to get valuable insight from data, not least due to issues such as organisational data silos, challenges relating to data quality, or the ability to work with unfamiliar non-financial data. To help counter this, the software industry continues to develop a growing range of tools and applications to help companies of all sizes find and extract insights from their data. But this remains challenging because businesses must first determine how they will use data to improve their performance before selecting a technical solution.

- **Finance professionals are well placed to help translate data into commercial insights and value.**
  More than 90% of survey respondents agree that finance has an essential role to play in helping their organisations benefit from data-related projects. But there is also often uncertainty as to what that role might be. Advanced types of data analysis will often require the expertise of data scientists, who may hold a PhD in a relevant discipline, and it is rare for finance people to have the specialist skills required in this area. However, where finance can add value is by applying their combined knowledge of finance and the business to help translate new analytical insights into commercial impact – for example, through planning, budgeting, forecasting and performance management. "It's not our job to go down to the lowest level of data, but to know how to aggregate outcomes so it can be converted into an insightful report," argues James Miln, Senior Finance Director, Global Operations Finance, Yahoo!.

- **Delivering on the potential of data will make closer finance/business partnering more important than ever.**
To truly unlock the opportunities in big data, management accountants will need to partner more closely with three sets of key stakeholders: their colleagues in IT who capture much of the data; the data scientists who can perform advanced types of analysis on that data; and finally business leaders who can ensure new ideas are turned into concrete action. This requires financial professionals to have a broader range of management skills: clear communication, the ability to lead and influence, and a strategic understanding of the business – all of which are essential for the business partnering role that many firms want finance to play.

- **Delivering on new data insights is as much an opportunity for small and mid-size companies, as it is for large ones.**
Companies of all sizes see the scope to benefit from building a more data-centric business. Although smaller businesses have fewer resources for data projects, they have less legacy IT complexity to deal with, as compared with their larger counterparts, along with a willingness to move quickly. They can also tap into a growing number of easy-to-use applications and data services, which can help them benefit from data at minimal cost or risk. However, the key to success for small as well as large firms is to develop clear objectives for their data projects, and only then to select the tools or services that are best aligned to their particular goals.

- **Data also holds opportunities for finance professionals to unlock new career openings.**
The data-enabled era creates an opportunity for today's management accountants to develop new skills and competencies. Indeed, 85% of survey respondents believe that increasing their ability to work with big data will enhance their career and employability. Although some will no doubt seek to bolster their data analysis skills, the ability to play a central role in converting the potential of data into real commercial value could act as a boost for those with an aspiration to play a more strategic role in the organisation.

The challenges outlined above are substantial, and will certainly stretch finance professionals' skills into unfamiliar areas. However, management accountants have proven their ability to adapt to changing demands in the past, for example evolving their roles and capabilities to meet the demands of the post-industrial era of business. Today a similar evolution is required, with management accountants acquiring new skills and new ways of thinking that will put them at the forefront of the way their organisations harness data for commercial advantage.

**"**

Over 90% of CGMA professionals say finance has an essential role in helping business benefit from data projects

## Five traits of the data-enabled CFO

Finance leaders who run a data-centric finance function typically share several common traits, including the following:

1. **Able to identify which data points are useful in understanding what drives the business.** Data-enabled CFOs understand the fundamental drivers and metrics of the business, as a foundational element in assessing new, less structured sources of data.

2. **Have a clear sense of what customers care about most, and ideas about how to track this.** They also have a clear grasp of why customers choose their organisations' products and services, how those customers are acquired and what helps retain them.

3. **Able to embrace new forms of data, and creative ways to incorporate this into business decision-making.** Beyond pure financial and enterprise data, a data-enabled CFO needs to be open-minded about new types and sources of data, from sometimes unexpected or unconventional sources – both for themselves, and their team overall.[2]

4. **Comfortable with uncertainty, including the reality that big data may not provide definitive answers.** As they embrace new and in some cases less proven data sources, companies move into types of analysis that may not provide the certainty finance prefers. CFOs need to embrace fresh techniques and strategies that can boost decision-making in a world flooded with data.[3]

5. **Explore new ways to interpret data to better inform management.** Data-enabled CFOs are also adept at quickly picking out the results that matter from data, often finding new visual ways to communicate the points that matter most – and to ensure a stronger commercial uptake and impact.

# INTRODUCTION: THE DATA-DRIVEN BUSINESS ERA

Technology continues to change the rules of business. Building on the increased computerisation of the workplace that has been occurring since the late 1980s, companies are now in a digital age of business. The widespread adoption of enterprise resource planning (ERP) systems, electronic point of sale (EPOS), e-commerce and other internet-based systems has allowed more and more organisational data to be captured digitally.

Since the turn of the century, the rise of social media, increasingly ubiquitous mobile devices, cloud computing, and a plethora of sensors that are linking physical objects to the 'internet of things', have all added an exponentially increasing volume of data that is available to business.
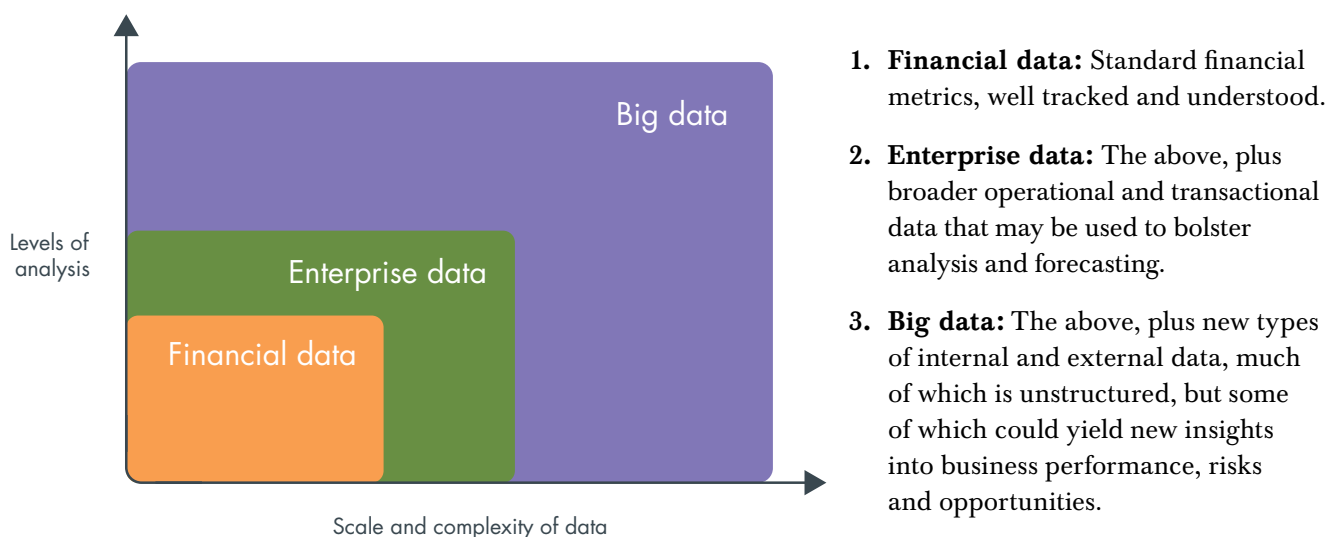
This data includes a mixture of structured internal data and typically unstructured external data, encompassing voice recordings, pricing data, images, social media posts, geo-location information, and far more. According to the Economist Intelligence Unit, at least six in ten companies now capture contact-centre data, including recorded conversations, staff messaging, syndicated third party data, such as weather or market information, and government data.[4] Just over half of those companies also collect machine-generated data. This so-called 'big data' all adds to the accounting and business information that companies already collect and analyse. Although data scientists and IT experts have particular definitions for big data, this report

simply uses this term as shorthand for the massive increase in the volume of data now being used to garner new insights into business performance, opportunities and risks (see Big data defined).

When people talk about the latest trends in big data, a lot of the excitement focuses on new forms of unstructured data. Management accountants certainly need to be alert to developments in this area. However, for most business there is still vast untapped potential in the structured data captured on their systems (enterprise data). Both these areas are important, but usually it makes sense for management accountants to start by getting to grips with enterprise data first.

According to McKinsey & Company, the growth in big data will spark a new wave of "innovation, competition, and productivity" within business.[5] As two prominent academics put it, "Using big data enables managers to decide on the basis of evidence rather than intuition. For that reason it has the potential to revolutionise management".[6]

FIGURE 1: Big data defined



1. **Financial data:** Standard financial metrics, well tracked and understood.

2. **Enterprise data:** The above, plus broader operational and transactional data that may be used to bolster analysis and forecasting.

3. **Big data:** The above, plus new types of internal and external data, much of which is unstructured, but some of which could yield new insights into business performance, risks and opportunities.

Procter & Gamble (P&G) is one example of this trend in action, where the firm's ongoing digitisation increasingly acts as "a source of competitive advantage" – helping improve everything from product innovation by analysing real-time social media comments from clients, through to using tracking data to optimise retail store layouts.[7] P&G's experience is borne out by broader research. Research from the Sloan School of Management shows that companies that use "data-directed decision-making" achieve a 5-6% boost in productivity.[8]

These case studies show that the opportunities arising from big data are substantial. Against this backdrop, IT vendors are developing an ever-growing array of big data tools, ranging from new data analytics applications and executive dashboards to predictive analytics (see Jargon buster). Big data is now at the peak of Gartner's hype cycle for emerging technologies[9]. The hype cycle illustrates the stage of maturity in the adoption of new technologies. The pattern is for initial excitement about a new innovation to inflate expectations above its true potential, before a period of disillusionment when expectations aren't met. Later, typically over a five to 10 year period, the technology's real potential becomes clear as users achieve tangible benefits. This suggests big data technology may be entering a period of disillusionment before its true value is fully understood.

Advances in technology, along with simpler and cheaper analytics and data visualisation tools, are opening up data opportunities for firms of all sizes. But, for most businesses, adapting to a data-driven business environment remains a work in progress. One report suggests that one in four companies has yet to tap most of their organisational data, while another 53% estimate they use only half of their valuable data.[10]

Growing attention is being paid to new analytics techniques and tools, aimed at drawing new insights from data. However, few companies have the range of complementary skills required to translate these analytical insights into true commercial impact. This is where management accountants hold a clear opportunity to deliver value.

As we will outline in more detail later in this report, finance can make an essential contribution as part of the team working on these new data initiatives. The advanced analytical techniques necessary to mine data, identify new correlations and develop algorithms to predict behaviours are in the domain of data scientists. But management accountants' roles in producing financial accounts, and in the processes of budgeting, forecasting and performance management, put them in contact with every aspect of a business.

Contributing such information provides management accountants with an excellent overview of the business. They can therefore play an important role in ensuring that the analytical insights gained are translated into tangible commercial impact.

## Jargon buster[11]

Recent technology developments are transforming the way leading companies manage and analyse their data. Management accountants should be familiar with the following terms in particular:

✓ **Data analytics**
Data analytics refers to advanced forms of analysis that can be used to explore large volumes of data and communicate insights. These can be used to identify correlations and develop algorithms to predict behaviours. Data analytics with regard to structured or enterprise data is well established. It is used by many companies and organisations to help make better business decisions, and to test and validate models or theories. There are now high expectations of data analytics with regard to new forms of unstructured data.

✓ **Cloud computing**
Cloud computing refers to the provision of various services, such as software applications, development platforms, servers, processing power and storage, via remote servers over the internet, as opposed to on a local server. Typically referred to as the 'cloud', it often entails users paying for IT services as needed, while the back-end application or infrastructure is managed by a third party vendor.

✓ **Dashboards**

A data dashboard is a user interface that organises and presents corporate information in a way that is easy to read and interpret. It can be used to aggregate a range of data and KPIs, often visually, for managers to monitor business performance.

✓ **Data mining**

A set of techniques used to sift through very large amounts of data. Data mining uses artificial intelligence techniques and advanced statistical tools (such as cluster analysis and regressions) to reveal trends, patterns and relationships.

✓ **Data scientist**

A data scientist is someone who performs statistical analysis and data mining on large volumes of data, typically to identify trends, figures and other relevant information. Makes use of advanced modelling, statistics, analytics and mathematics techniques.

✓ **Data visualisation**

Data visualisation is a general term used to describe technology that enables business managers to see trends and data patterns. These tools often go beyond the standard charts and graphs used in Excel spreadsheets, using more intuitive dials and gauges, geographic maps, time-series charts, heat maps and so on. Patterns, trends and correlations that may otherwise be missed can be spotted more easily with data visualisation software.

✓ **Hadoop**

Hadoop is a Java-based programming framework that supports the processing of large data sets in a distributed computing environment. It is available as open source software from Apache, and is commonly used to handle huge data volumes, spanning thousands of servers.

✓ **In-memory processing**

In-memory processing enables businesses to analyse large data sets significantly faster than before, by allowing data to be processed in the system's memory instead of the slower, traditional processing taking place in the hard drive.

✓ **'Internet of things'**

The 'internet of things' describes the connecting of everyday physical objects to the internet, allowing them to provide information or alerts as a node on the network. This provides organisations with a vast new source of information on every aspect of their business, by connecting and monitoring machinery, vehicles, equipment, stock items and much more.

✓ **MapReduce**

MapReduce is a software framework that allows developers to write programmes that process massive amounts of unstructured data in parallel across a distributed cluster of processors or stand-alone computers.

✓ **Metadata**

Metadata is data that describes other data. It provides a valuable reference to help organise and locate particular types of data. Examples of metadata on a simple document would include metadata on the date the document was created, date modified and file. Metadata is also used for images, videos, spreadsheets and web pages.

✓ **OLAP**

Short for online analytical processing, a category of software tools that provides analysis of data stored in a database. OLAP tools enable users to analyse different dimensions of multidimensional data. For example, it provides time series and trend analysis views.

✓ **Predictive analytics**

Predictive analytics is the branch of data mining concerned with forecasting probabilities. It uses variables that can be measured to predict the future behaviour of a person or other entity. Predictive analytics leverages an organisation's business knowledge by applying sophisticated analysis techniques to enterprise data. In business, predictive analytics are often used to answer questions about customer behaviour and offer suggestions on how best to target resources for maximum return.

✓ **Social media**

Social media is the umbrella term for software tools and platforms that allow groups to generate content and engage in peer-to-peer conversations. Facebook and Twitter are merely the two most high profile examples of such platforms.

✓ **Unstructured data**

The term 'unstructured data' refers to any data that has no pre-defined structure, and thus cannot be easily stored within standard relational databases. Examples include email, text-based documents, images, videos and call-centre recordings.

# HARNESSING DATA FOR COMPETITIVE ADVANTAGE

In preparing this report, we surveyed more than 2,000 CFOs and finance professionals. They hold clear views on the potential of big data: nearly nine in ten (87%) agreed that it is going to change the way business is done over the next ten years.

At a basic level, companies will increasingly adopt data-driven decision-making, both for their strategic choices and also for granular operational issues, and to boost overall performance. Beyond this, some businesses will find ways to turn data into a new revenue source, or even restructure their business models around data.

Just as businesses will have to evaluate how to change in order to maximise the potential of data, so too will the finance function. Over eight in ten (84%) of those financial professionals polled think that big data and analytics will require a change in how they do their jobs in the coming five years. For example, companies will increasingly ask finance to provide a real time, forward-looking perspective of corporate performance, instead of relying on accounting data that is typically historical in nature. However, as of today, nearly one in three (32%) thinks that their organisation doesn't have the skills needed to make use of new and growing volumes of data. This is consistent with expert predictions of a talent shortage of individuals with deep analytics skills over the coming years.

But management accountants have proven their ability to evolve and adapt to changing circumstances in the past. A century ago, managers needed better management information about their costs and processes as industrialisation had changed how businesses operated. It was in this context that professional management accounting emerged. Today, big data provides a new source of insight and evidence to once again enhance decision-making. Those management accountants who are able to harness new data insights could play a vital role in helping to redefine how business is done.

## A cross-sector opportunity

The emergence of a more data-rich business environment holds opportunities for firms of all types and sizes. As one example, a recent Economist Intelligence Unit survey of C-suite executives flagged up a str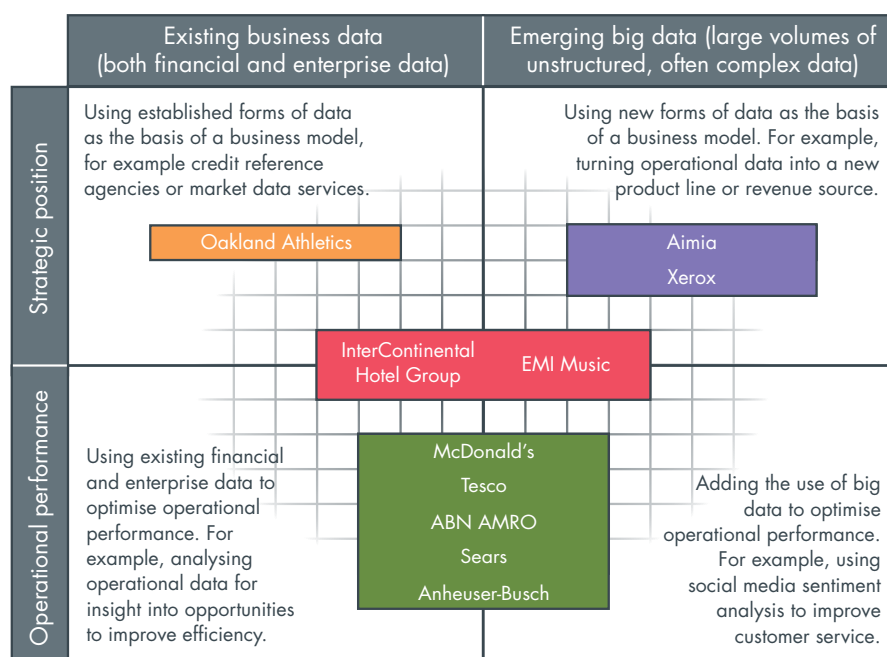ong relationship between earnings growth and strategic use of data.[12] Furthermore, a major McKinsey study argued that significant value could be generated from using data better in each of the industries it had studied.[13] Beyond these examples, there is a growing list of specific case studies of companies deriving value from data. A selection of these is profiled in Figure 3, highlighting the diversity of opportunity being uncovered.

Across these and other examples, it is clear that data is being used in widely differing ways across different types of companies. The majority are focused on bolstering operational performance within the business, whereas others are pushing to make data part of their core competency, creating wholly new product and service offerings on the back of the data being collected. Depending on their main objectives, the focus for data exploration also varies widely – with some companies primarily concentrating for now on analysing structured data already captured in enterprise systems. However, the opportunity to go further is clearly there. Even restricting themselves to structured data, companies can fill gaps by using external data providers such as Experian, Dun & Bradstreet and many others. Beyond this, for the more sophisticated and experienced data explorers, there is the vast world of big data.

While most public examples are from large companies, smaller companies are clearly engaging in this too. Some bigger firms are even creating new data services on the back of supplying new data and analytics services to smaller firms in their supply chain – P&G, for example, now helps small retailers analyse how best to improve store performance[14], which also illustrates how data can provide both operational gains – and new business opportunities.

The following table highlights how a diverse range of companies are putting data to use, gaining operational or strategic benefits. The categorisation of these examples is not meant to be precise, but to provide illustrative examples spanning all four quadrants.

FIGURE 3: The four key data-usage types[15]



| Company | Sector | Data-related exercise | Benefits achieved |
|---|---|---|---|
| **Anheuser-Busch** | Beverages | Tracks both business and big data, covering retail store layouts and sales patterns, to precisely target beer brands and merchandising in particular stores and areas. | Improve store merchandising to increase sales performance |
| **Sears** | Retail | Created advanced data analytics service to cut time taken to create sales promotions from eight weeks to just one, while boosting effectiveness of campaigns by making them far more targeted. Draws on vast amounts of customer, product and promotion data. | Improve sales and marketing performance |
| **ABN AMRO** | Retail banking | Taps a range of new data sources to better understand customers and sales patterns across the bank, for example by more accurately segmenting potentially high value customers and customising offers for them. | Improve customer service and sales performance |
| **Tesco** | Retail | Processes transactional data from tills, linked with customers' loyalty cards, to better understand purchasing patterns. Allows for more targeted deals, such as offering both nappies and beer to new parents, after realising that new parents won't go to the pub as often. | Increase sales and marketing performance |
| **McDonald's** | Fast food | Analyses huge volumes of data to optimise everything from menu selection, drive-thru congestion, stock levels and staffing. For example, can speed drive-thru times by forecasting likely orders. | Improve overall operational performance |
| **InterContinental Hotel Group** | Hotel | Built a data platform that makes use of a wide range of both internal and external data to improve operational reporting and customer service, while predicting guests' purchasing patterns and proactively identifying market trends to guide investment. | Improve operational performance and strategic decision-making |
| **EMI Music** | Media and entertainment | Uses big data to select promising new artists to promote, tapping into diverse data sources, such as online downloads, TV and radio mentions, piracy rates, and so on. Used this to identify a little-known artist and secure a number-one hit. | Increase sales and marketing performance, and strategic decision-making |
| **Oakland Athletics** | Professional baseball | As popularised in the film Moneyball, the under performing team used data analytics to identify high value players available at low cost, boosting the team's overall league performance. | Improve strategic decision-making |
| **Aimia** | Loyalty scheme | Partnering with Yahoo! to offer customers loyalty points in exchange for search-related advertising that is far more targeted, creating a wholly new business offering. | Create new data-driven products and services |
| **Xerox** | Document management and printing | Creating new data services for cities, on the back of existing printing and document services. For example, developing a dynamic pricing system for parking in Los Angeles on the back of existing ticket printing services, allowing for diversification of the business. | Create new data-driven products and services |

# Big data, small businesses

Big data and analytics provide numerous opportunities for small and medium enterprises (SMEs) too. While smaller companies typically have limited resources and smaller budgets, they do have other advantages: typically, a more flexible IT infrastructure, with fewer legacy system issues or disparate databases, and an ability to change practices quickly.

Our survey results show that, while small companies are more likely to rely on intuition than data to make decisions, they also understand the opportunities that big data presents – and are less likely to be deterred by cost. In this data-driven era, SMEs that choose to ignore the value of data in decision-making run the risk of losing out to others who are improving performance and gaining new insights from their data.

Using specialist software or services, SMEs can combine existing enterprise data with external data to uncover new insights. While traditional tools from major vendors may be unaffordable for many SMEs, many online and cloud-based options are available to help analyse data – including Google Analytics, Kaggle, Swipely and Tableau, to name just a few. These tools give SMEs access to powerful means for making sense of their business performance in new ways. The large vendors are also developing analytics platforms for middle market companies, including cloud-based applications.

This can start at the most basic of levels: when Morey's Piers, an amusement park operator in the US, wanted to assess the relative popularity of different rides, it literally bagged the paper tickets and weighed them.[16] "It was so unsophisticated," notes Jim Blake, CPA, CGMA, the firm's CFO. Today, electronic gate scanners now provide clear data on which rides are performing, and which might need to be switched. To build on this, Blake now works with an external analytics firm, to do deeper analysis of the ticket packages it sells

online, and which rides are doing most to boost the business. "My view is more in terms of strategy, where we're going," explains Blake. "It's not reacting week to week. My emphasis is on what's going to happen three, four, five years from now."

For Sweaty Betty, a UK women's retailer, the data and the geo-demographical services from Experian provided them with detailed insight into their customers' profiles and helped determine new store locations.[17]

Then there is Farmstead Table, a restaurant near Boston, which serves up locally sourced food. The restaurant is using Swipely to crunch its customer and payments data, which it uses to surprise and attract customers in smart new ways.[18] For example, by realising that some regular customers always order the freshly caught salmon, the restaurant could proactively advise them when a new catch had come in. This has boosted both sales and loyalty.

Some small businesses are even developing new data services off the back of these software tools. Powerhouse Factories, a brand-building agency, is one such example.[19] It adopted data tools from Tableau, a data analytics platform, to replace its prior reliance on Excel and help visualise issues for clients – showing how delays at checkout queues affected a retailer, as one example. The platform also streamlined customer interaction by hosting all the data in a single place that everyone could access, while ensuring a single view of the business information in question.

More adventurous SMEs are even tapping into the capabilities of advanced data scientists, even without the budgets or capability to bring such resources in-house.[20] One mobile app developer, Jetpac, which provides an app that turns friends' photos into a custom magazine, wanted to develop an algorithm to automate the process

of finding the best pictures to use, as one example.[21] To do so, the firm turned to Kaggle, a platform that matches data-related requests with leading data scientists from around the world. In three weeks, and for just US$5,000, Jetpac found its answer – far cheaper and faster than it could ever have done itself.

All told, tools like these are changing the scope of possibilities available to SMEs on data. It also highlights that embracing data tools doesn't have to mean a huge financial commitment on the part of SMEs to IT-service providers.

## CASE STUDY

### SECRETS OF SUCCESS FROM DUNNHUMBY, A RENOWNED LEADER IN CUSTOMER ANALYTICS

Leading customer science company dunnhumby uses advanced data analytics to help its clients understand their customers better. The company rose to prominence in the mid-1990s with its pioneering work with leading British supermarket chain Tesco's, using data from Tesco Clubcard to analyse the retailer's customer base in innovative new ways.

The company has gone on to work with many other leading global brands, but it believes that smaller businesses can also now benefit from better data analysis. However, companies need to start by understanding the data assets they have at their disposal from the outset of any project. "Your own data is the place to start," says Matthew Keylock, Global Capability Managing Director of Data, dunnhumby. "Buying third party data may be fine for prospecting activity, and can add colour to your own customer records, but it is not the foundation you want to build on."

For this reason, Keylock recommends that firms initially assess what sources of data they have available (eg customer contact details, organisation details and roles, historical engagement data, including products and services purchased, and so on). It is also important to seek out data owners within the organisation, and explore how sharing their data sources could create some quick win opportunities for the business.

"Companies should look to create the greatest understanding and value they can from their data sources, but they must also transfer learning about customers across their business," says Keylock. Firms should also segment their customers and reappraise this data regularly to understand trends and patterns in their customer base, for example to help them identify and address declining client accounts, but also to reward desirable behaviours. "As you develop a more connected data view, insights coming from it will typically challenge accepted 'norms' in the business and will tell you many things you didn't know," Keylock adds.

Finally, Keylock recommends that companies should implement data projects in phases and build on each success, remarking that "A massive data project with the hope of some future value is a high risk undertaking!"

# WHERE FINANCE SEES DATA'S POTENTIAL

Finance professionals are increasingly aware of some of the new opportunities arising from data. When asked where they felt their organisation could benefit most from improved data quality and analysis, the most popular response related directly to the bottom line: the ability to identify opportunities for cutting costs or increasing efficiency.

This aligns with other research: McKinsey & Company estimates that just one sector – the US healthcare sector – could save US$300bn annually, by using big data to drive efficiency,[22] for example.

Beyond this, finance professionals also see clear scope to benefit from developing and monitoring new or improved KPIs. At Unilever, for example, the finance function has created a data dashboard that pulls in a diverse set of sources, from social media through to market research agencies, to provide a set of KPIs that are globally relevant, consistent and tangible, and which can be linked back to P&L reporting and cash flows.[23] At Worldwide Studios, the first party game studios for Sony PlayStation, Arthur Tan, Senior Director for Business Planning, says that tapping into

new sources of data has helped the company develop more effective indicators about gaming performance, from daily average users and retention ratios through to game monetisation rates. "Using traditional data sources, you'd probably not get these out of your financial systems, you have to go to big data to get this," he explains.

After identifying opportunities and developing KPIs, the third benefit finance professionals see from data relates to driver-based forecasting, or basing financial for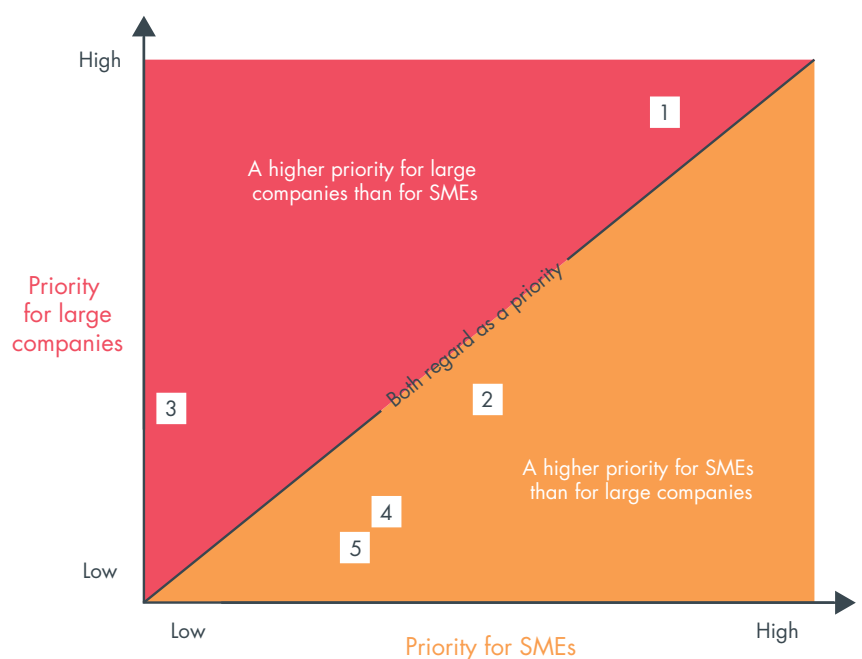ecasts on operational drivers (see Figure 4). Getting timely, high quality data is essential for such forecasting[24], which explains why many respondents see clear potential benefits from this.

FIGURE 4: Top five business areas that could benefit from better data quality and analysis



Priorities for using data (ranked in order):

1. Identifying opportunities to increase efficiency or save costs
2. Developing and monitoring KPIs
3. Driver-based forecasting
4. Monitoring external risks
5. Increase revenues (through better customer segmentation, etc)
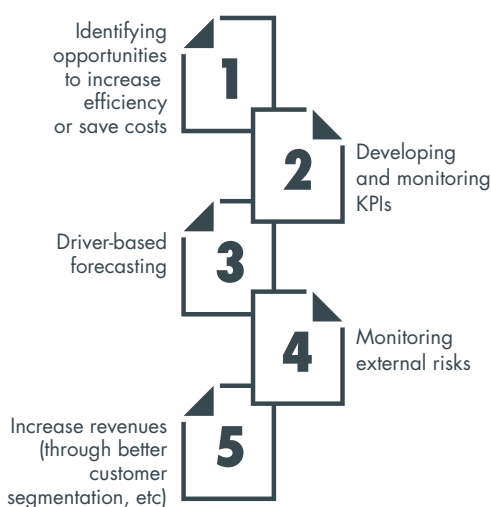
SMEs' priorities compared with large companies' priorities:

Source: CGMA data survey 2013[25]

These are not the only benefits. A related gain is the ability to improve the responsiveness of decision-making and strategic planning, as James Miln, Senior Finance Director, Global Operations Finance at Yahoo!, explains. "Rather than rely on the traditional month-end reports that used to be commonplace, we now have daily metrics that highlight how our users are behaving across a variety of touch points. This allows us to be much more agile in the decisions we make."

Armed with these insights, companies can often make improvements to their core processes and business models. This can often lead to substantial cost savings or new business opportunities. United Parcel Service used analysis and optimisation of its delivery routes and driving patterns to cut its fuel consumption by 8.4 million gallons in 2011, for example.[26] Elsewhere, Visa uses analysis of its transactional data, along with a range of new types of information, such as geo-location, to cut out billions of dollars in fraud annually.[27]

Of course, data can also drive new revenues. At Sony Games, various sales and in-game data are now used to help bolster sales by giving better insights into the gaming experience (see case study Using data to make more profitable games at Sony). Rolls-Royce is one of the most high profile examples of this, which in turn has helped the business generate billions of dollars of services-based revenue, by switching its core proposition to sell flying hours, rather than purely jet engines.[28]

> **"**
>
> We now have daily metrics that highlight how our users are behaving … this allows us to be much more agile in the decisions we make.
>
> James Miln, Yahoo!

## CASE STUDY

### USING DATA TO MAKE MORE PROFITABLE GAMES AT SONY

Sony's PlayStation is a major global brand, with many of its related gaming titles going on to be major bestsellers. For the business, this is vital: consoles are sold at minimal margin, with the majority of profits coming from the games it develops. A top-selling game will bring in major revenues, which puts significant pressure on the business to bring out highly rated new titles. This is the key challenge for Arthur Tan, who oversees the business and financial planning, and the business intelligence, of Sony's unit responsible for developing new games.

While Sony's product developers use data to improve the game playing experience, Tan's main challenge is to leverage information to help improve the business's overall performance. This starts with the typical KPIs, from a title's profit and loss through to total sales and downloads. Beyond this, however, Sony has begun to explore additional data: how much time people spend playing games, how often they log in, and what they do within the game, as just a few examples.

By capturing trends in large sets of behavioural data, it can make tweaks and changes aimed at making a game more appealing, or revise its pricing model to boost demand. In one recent example, the data showed that a product was not generating the expected volumes of user conversion. The forecast spend was significant, but the data supported the decision to stop the project, saving considerable expenditure.

## Challenges to overcome

The rapid expansion of the data that businesses now have at their disposal leads to a corresponding expansion in the kinds of insights that can be extracted using various analytics methods. Types of data analysis required range from basic reporting right through to predictive analytics (see Figure 5).

Furthermore, as additional tools and services are developed, the range of available options continues to grow. Consulting companies now offer analytics services covering working capital, customers, HR, marketing, predictive asset maintenance, enterprise performance, advanced planning, fraud management and risk analysis, as just a few examples.

Given the broad sweep of possibilities, organisations should start by identifying the key business questions they actually want answered. In particular, an organisation needs to fully understand its business model and its intangible assets, its data structures, data quality and data sources before delving into the world of unstructured data analysis. Joe Peppard, Professor at the European School of Management and Technology in Berlin, comments

that "Businesses can use data in two ways: to support decision-making and to discover new knowledge. Discovering new knowledge typically begins by posing questions of the data, often to uncover the 'unknown unknowns'. Thus, the quality of both the inquiry process and the data used is paramount. For some decisions, businesses can use reports and dashboards that have previously been defined to support them. These are typically created using business intelligence (BI) tools and report writers. For others, whether a decision is required emerges from the knowledge discovery process."

> 66 99
>
> **Businesses can use data in two ways: to support decision-making and to discover new knowledge.**
>
> Prof. Joe Peppard, European School of Management and Technology

FIGURE 5: Different levels of data analysis
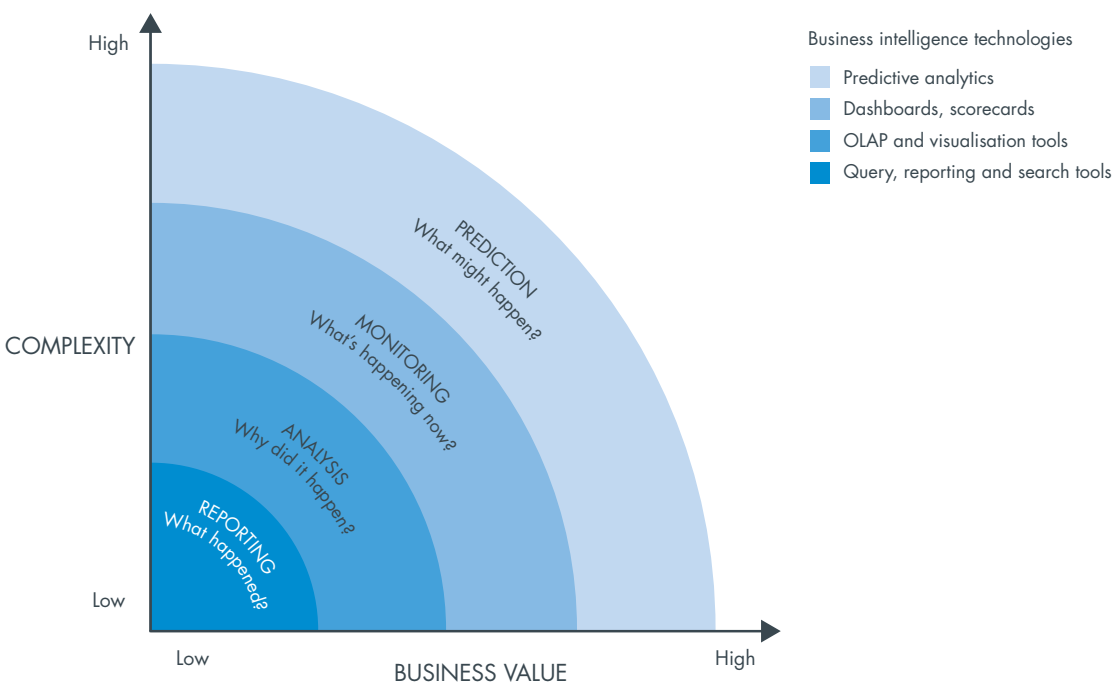


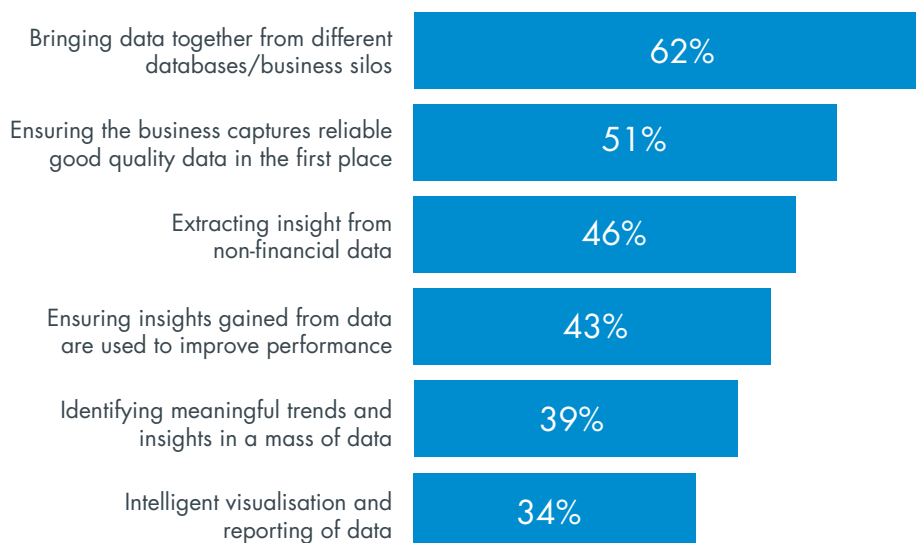Source: The Data Warehousing Institute[29]

Once the problem they are trying to solve is defined, organisations must identify the data needed to answer their questions. Bringing that data together in a way that can be analysed is itself a significant challenge. In our survey, organisational silos that obstruct data aggregation were flagged as the most common weak point, cited by 62% of respondents (see Figure 6).

Data quality is another issue, with about half of finance professionals seeing weaknesses within their organisations on this. Furthermore, about two-thirds felt that significant improvements were needed on the accuracy and reliability of data, in order to properly inform decision-making or performance management. However, it is important to strike the right balance, since accountants can tend to over-emphasise the importance of data integrity, given how important this is for statutory reporting. In data exploration, by contrast, finding patterns or correlations to determine whether something is directionally correct may matter more than total accuracy.

A related issue to this is data security, and the standards of governance that management accountants need to bring to bear on this important and often sensitive issue. This is a significant topic in its own right, and beyond the scope of this report, but it is clear that management accountants need to be aware of the issues and ethics involved in handling confidential information as they delve deeper into the world of data.

Jaroslaw Chrupek, Global Data Manager at British American Tobacco (BAT), notes that, in order to maximise the benefits from a company's investment in big-data technology, it is critical to ensure that solid data infrastructure and compliance procedures are already in place. "An investment in big-data analytics can be considerable when compared with spending a similar sum on building a robust information management system, making sure that data-related standards are properly managed, and up-skilling the appropriate teams so they can use analytical and business intelligence." (See case study Bridging finance and IT at British American Tobacco.)

FIGURE 6: Where are the weak points in your organisation's current skills to capture and extract valuable insights out of data?



| | |
|---|---|
| Bringing data together from different databases/business silos | 62% |
| Ensuring the business captures reliable good quality data in the first place | 51% |
| Extracting insight from non-financial data | 46% |
| Ensuring insights gained from data are used to improve performance | 43% |
| Identifying meaningful trends and insights in a mass of data | 39% |
| Intelligent visualisation and reporting of data | 34% |

Source: CGMA data survey 2013[30]

# CASE STUDY

## BRIDGING FINANCE AND IT AT
## BRITISH AMERICAN TOBACCO

As one of the world's largest cigarette makers, British American Tobacco (BAT) has a keen interest in the rewards of data-driven strategies. Jaroslaw Chrupek works as BAT's Global Data Manager, where he oversees data and process governance, combining both IT and finance knowledge. "Within BAT, we have a number of people with strong financial backgrounds as well as IT knowledge and experience. This combination means that they're able to understand the requirements of the business as well as what is achievable from a data perspective."

BAT has made considerable progress through the adoption of a single data platform to help reshape the company's operating model and enable it to operate in a more agile way. For example, it will be much easier and less costly to update the new integrated system to reflect evolving business needs than was possible when BAT supported multiple platforms.

According to Chrupek, data can be an invaluable tool to help management accountants achieve one of their fundamental objectives – to have as rich and detailed an understanding as possible of the business in which they work. However, he advises that finance focuses on understanding the power of data that already exists within the enterprise before they invest heavily in advanced tools for big data. "Big data capabilities are costly and the usage is limited to real data specialists. More basic tools such as business intelligence can have just as big an impact, and will be of more use to the average user in the organisation," Chrupek concludes.

# TURNING INSIGHT INTO IMPACT

Our survey results show that finance is already working with other departments to help extract value and insight from data. Many note that finance takes a lead role on this in some areas. This task is often divided up across several internal teams.

According to Gwyneth Gittings, Vice President, Global Segment and Management Reporting at American Express, for example, both the finance team and other functions are engaged in analysing business data. The company's management accountants are closely involved in both process and performance analytics aimed at boosting both organisational effectiveness and business outcomes, whereas the financial accounting team focuses more on results analysis and the breakdown of data into specific components. Forward looking predictive analytics is performed in many finance decision support teams but is also the responsibility of specialised business functions and data scientists that sit outside finance.

This is not an isolated example. 37% of survey respondents – the single biggest group – said that within their companies, finance leads on all finance-related data analysis, while playing a supporting role in relation to other data analysis. This fits with input from those interviewed for this study, which emphasised that finance has less to offer in terms of advanced analytics, but that they are vital when it comes to translating these analytical insights into tangible business outcomes. Indeed, nearly one in four (23%) primarily focus on reporting performance data, leaving the analysis component to other functions. While approaches will vary, experts interviewed for this report were in broad agreement that finance needs to work as part of a cross-functional team if they are to contribute effectively to the process of harnessing data.

FIGURE 7: What role does finance play in extracting insight from data in your organisation?



Finance provides the link from new insights gained from data to the planning and budgeting needed to achieve impact

The finance team leads most initiatives to analyse data in the business

Finance works as an equal partner with IT and business heads on analytical tasks

Finance primarily reports financial performance data, leaving the analytics to business teams elsewhere

Finance leads on finance-related data, and supports on other forms of business analysis

9% 9% 21% 23% 37%

Source: CGMA data survey 2013[31]

Finance professionals are especially well placed to ask the right questions at the outset of a data analytics project, while also ensuring that any insights generated are actually used to aid decision-making and drive business performance. In essence, they can serve as a bridge between the technology specialists who carry out the core data analysis, and the board and senior managers needing the tangible insights derived from this analysis. "Finance is a link between the data and its financial implications," as James Miln, Senior Finance Director, Global Operations Finance at Yahoo!, puts it. Furthermore, this provides a key opportunity for finance to play a bigger role in identifying new opportunities.

## The business-partnering imperative

If they are to play a bigger role in driving commercial value out of data, management accountants will need to partner more closely with three sets of business stakeholders. First, close ties with the IT function will be vital, since their help is needed in capturing and extracting data from the organisation's IT systems. Second, many companies now employ specialist data scientists who have advanced analytical skills – but who need finance's help to ask the right questions of

the data, and also to interpret insights and patterns that arise from the analytical process. Finally, finance must work closely with managers across the business to help ensure that data is gathered and interpreted properly to provide a coherent view to help inform business decisions.

Yahoo!'s Miln stresses the role to be played here by the finance function: "Good finance people ask good questions of the business." At the very least, they can ensure that whatever analysis is being conducted is aligned with business needs. As BAT's Chrupek puts it: "It's likely to be more of a challenge for someone based in IT to define the information that is needed for the business than it is for someone in finance." Often, finance forms part of a core data team, which brings a variety of skillsets together to ensure robust analysis.

As part of this relationship, finance can also provide quality control, to ensure that data is being properly used and interpreted by the broader team. "Organisations are now looking to their finance teams to put rigour and credibility around information," says David Axson, Managing Director of Management Consulting with Accenture. "They are looking to them to verify it and bring analytical integrity to the

FIGURE 8: How management accountants link the business to data analytics
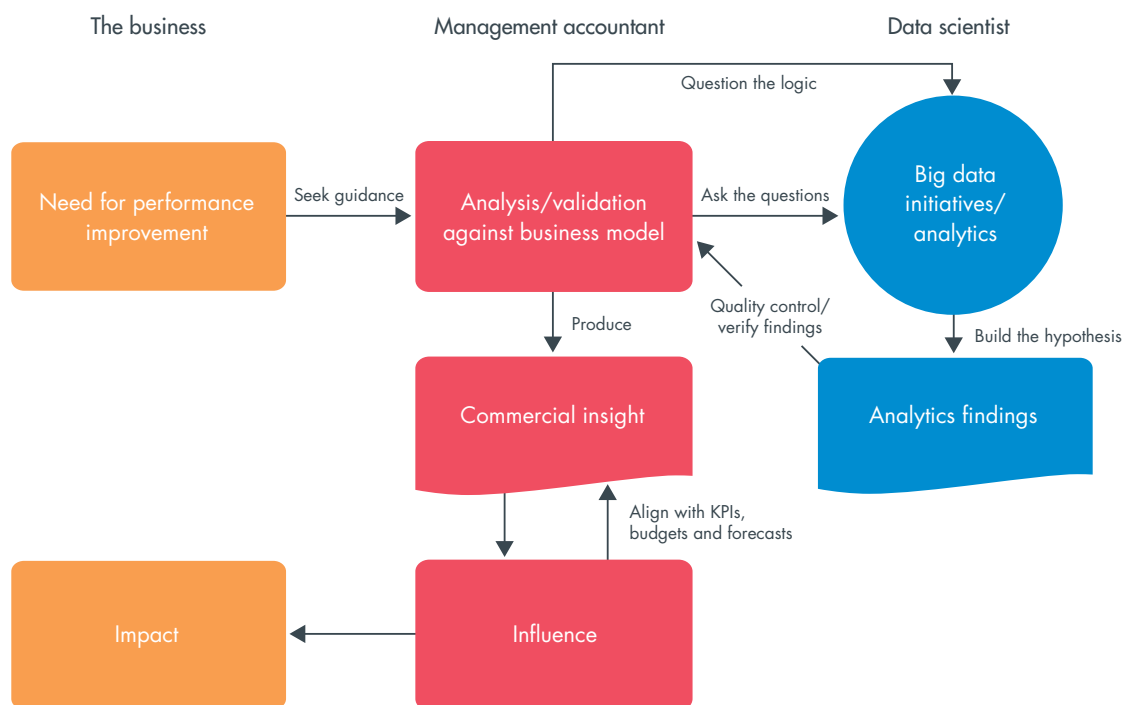
process. For example, organisations come up with a lot of correlations when working with data, but these could be entirely random. We need to understand what is really meaningful, and establish the causal relationships. Management accountants have a responsibility to verify the data and understand what's important."

Second, finance then needs to partner more closely with business unit leaders, taking the lead on translating any insights into tangible outcomes: incorporating them into KPIs, business reporting and budgets, so that they are both tangible and actionable. Business author Bernard Marr agrees: "You don't want your finance people to turn into data scientists. They need to be there to help you interpret the data. They can also push their organisations to search out other data sets that could help answer important business questions."

This is the most valuable input they can make, even though relatively few companies are there yet. "Finance definitely has a strategic role to play in converting insights into numbers to be used for management," argue David Geere and

Malcolm Wilkinson of Deloitte's Analytics Lab. As the next section highlights, a further aspect of this lies in finance being able to find new ways to communicate and visualise business data.

To get all this right, finance also needs to have sufficient strategic awareness and business understanding. "Management accountants should have enough acumen to be able to review a situation and challenge the findings being presented. But they can only do that if they understand the business model and the dynamics of the market," argues BAT's Chrupek.

> ❝❞
> **Organisations are now looking to their finance teams to put rigour and credibility around information.**
> David Axson, Accenture

## CASE STUDY

### GETTING FINANCE CLOSER TO THE BUSINESS AT YAHOO!

Companies in the high technology sector are often early adopters of practices that go on to become more prevalent in the rest of the business world. At Yahoo!, for example, the company's finance function has long had to gain a clear insight into the data captured by the company's key products – such as Yahoo! mail – in order to truly understand what drives revenue. According to James Miln, the company's Senior Finance Director, Global Operations Finance, this is vital. "Finance needs to understand who our users are and what they do – and what makes them attractive to advertisers. We work very closely with data

teams – even on fundamental definitions such as 'what is a user?' and 'how do we attach value to a user?'"

As more information becomes digitised, this approach will become even more important. The way that brands have a relationship with users through social media has a significant impact on Yahoo! products. "It wasn't that long ago that we would be waiting for the month-end reports. Now, we are in a position where the data is richer than ever – and available in real time. This means that we are able to move faster," says Miln.

All this, unsurprisingly, is pushing the finance team out of its comfort zone.

But for those who can adapt, this can be a valuable opening for career development, argues Axson: "This is an exciting opportunity for management accountants to get closely aligned with business leaders and play a more active role in the decision-making process." Many finance executives have already grasped this: in our survey, 85% of respondents agreed that these skills enhance a finance professional's career and employability. Quite simply, greater expertise in using data to inform and advise the business at a strategic level is closely linked to the attributes that businesses look out for in developing senior financial leaders.[32]

This all fits with a wider trend towards finance partnering more closely with the rest of the business. Recent research from Robert Half suggests that closer finance-business partnering has already become "mission critical" at many firms.[33] Truly delivering an impact from data-derived insights will make that need even clearer.

## Bringing data to life: communication and visualisation

Finance has a pivotal role to play in helping the business to translate new data insights into commercial impact, but to do this they also need to build on their communication and presentational skills. This is a challenge: 63% of respondents we surveyed highlighted the difficulty of communicating data-driven insights in an impactful way.

> **"**
>
> 85% of CGMA professionals agree having the skills to work with big data improves career prospects.

The ability to manipulate data and present it in ways that are insightful and relevant to the audience is key. This can start with the ability to drill down and cross-reference within existing data, such as on revenue or costs within a profit and loss statement. "There is a role for pre-defined, pre-determined data within finance, but in today's world this can be limiting," argues Martin Fitzpatrick, Vice President Finance, APAC at QlikTech, the maker of QlikView data analysis software.

Finance professionals are also showing increasing interest in the possibility of presenting their findings using data visualisation techniques. A number of tools are now available that can present data in a more intuitive way, which is a real benefit when dealing with massive underlying data sets. Confidence in adopting these tools will help finance play a more effective role in translating analytical insights into business impact.

Some aspects of visualisation can be as simple as plotting key business indicators on a digital map, as opposed to simply producing long lists – giving an immediate and powerful visual reference regarding where business issues are cropping up. As the business author Bernard Marr notes: "Finance professionals have to realise that the majority of people hate numbers. Human beings have always communicated in stories and pictures."

Finding better ways to communicate and visualise data is important for all businesses, but can be especially useful for smaller organisations, many of which may lack specialist resources internally, such as business analysts who can devote time to assessing data sets. When asked whether organisations rely more on intuition and experience, or data and analysis, when it comes to making strategic decisions, 65% of those in smaller and mid-size companies said the former takes precedence. The corresponding percentage is lower for larger organisations, but it is still high at 47%.

# CASE STUDY

## OPENING UP SME OPPORTUNITIES AT GOOGLE

The analysis of large amounts of enterprise data has allowed Google to grow its revenues significantly, not least by identifying profitable new niches to aim for – such as small and mid-size companies (SMEs). In previous years, Google had focused on advertisers that were larger and possessed significant advertising budgets. But as Ray Murphy, Head of Sales Analytics and Systems Solutions for Global SME Customer Acquisition at Google, confirms, the company already had excellent knowledge about the factors driving those companies. What was much less understood was the far larger pool of SME advertisers.

Using analytics, Google remedied this by asking a set of key questions of that group. For example, it sought to better assess which factors caused those advertisers to spend more. The success of this insight into the SME segment has led the company to yield significant year-on-year growth and it has become one of the company's fastest-growing channels. This data

analysis has also delivered internal efficiency gains: for example, while the firm assumed that a key factor influencing the business generated by sales teams within the company is the seniority of the sales person, analysis uncovered that the more junior roles actually generate more sales, which helped to set a more optimal staffing level.

The example also highlights how finance can make a commercial impact from data. "In many companies, management accountants are already adding significant value through the addition of valuable content in areas such as reporting and business planning," explains Murphy. "Now, the role has evolved to the point where they are helping to identify areas where significant corporate growth may occur. As a result, they are now spending more time offering strategic insight, problem solving and helping to steer the sales teams in the right direction."

# CONCLUSION: WHAT'S NEXT FOR MANAGEMENT ACCOUNTANTS?

Big data raises challenging questions about the future role of finance. Accountants could be sidelined as the professionals who specialise in providing financial accounts to report past performance. Alternatively, they could seize the opportunity to become champions of big data as a source of evidence to support decision making – and help to redefine how business is done.

Finance needs to look beyond traditional business metrics and recognise the commercial potential of embracing a wider set of data. In addition to the essential financial and enterprise data they already work with, finance will need to review other non-traditional sources of data in order to gain a more thorough understanding of business performance.

Management accountants have much to gain from and contribute to this new era. They already know how to work with data, they understand the inner workings of the business and they are well placed to help turn new data insights into commercial advantage. Their involvement also adds credibility to the end product. The finance professionals who deliver best on this will be those willing to adapt their focus to include big data, and push to become a more proactive business partner to the rest of the business.

That's not to say that the finance team is set to become technical data specialists. On the contrary, management accountants can best add value by working with the data scientists to make commercial sense of new data. David Burgess and Gustavo Penas from Shell's finance operations division put this well:

"Management accountants need to know what the critical pieces of data are and what insights can be derived from them. They do not necessarily need to know the in-depth database structures or actually do the analytics. Finance people need to understand what the outcomes of analytics are and how they can drive value for the business."

The implications of the shift to data-enabled businesses for finance are far-reaching. Companies need their finance teams to play a pivotal role, working with data specialists to drive meaningful commercial insights from corporate data and, most importantly of all, helping the broader management team to interpret and apply the power of that data to make better strategic decisions.

Inevitably, this will push finance professionals into new and unfamiliar areas, and require them to develop new skills and new ways of thinking. For those who can manage that transition successfully, however, there are clear opportunities to play a decisive role in an area that will become an increasing source of competitive advantage for firms of all types and sizes in the coming years.

> **"**
>
> Finance people need to understand what the outcomes of analytics are and how they can drive value for the business.
>
> David Burgess and Gustavo Penas, Shell

# FIVE STEPS TO CREATING A DATA-CENTRIC BUSINESS

## Step 1. Ensure you understand what new data would be relevant to your business model and competitive position

- Set out the business model and the intangible assets of your business. In particular, segment the main sources of income (by customers, channels or products) and the costs attributable to each (eg logistics, operations, promotions, etc).

- Identify the data needed to describe and understand the drivers of these income sources and costs.

- Consider what you would need to understand better to improve business performance overall.

## Step 2. Assess what data initiatives are already in place within your business

- Check what data platforms and initiatives are already in place within your organisation, and what data is already captured and/or analysed.

- Assess the speed and degree to which you can provide driver-based forecasting, or dimensional analysis of business performance; this may be in the area of business data and not require advanced analytics.

- Explore what external sources of data are potentially available for consideration.

## Step 3. Identify potential quick wins or small-scale proof of concept projects

- Assemble a team of enthusiastic people from different disciplines with the appropriate skills (IT, analysis, finance, business), backed by a high-level commercial champion.

- Working with a small sub-set of the data available, demonstrate how insights could be derived and what value these could be to the business.

## Step 4. Conduct a formal data project to develop a related strategy

- Set out a full-scale data project, which will collect and analyse data, and apply the resulting insights.

- Identify the technology, skills and structure required to make the strategy successful.

- Develop a business case.

## Step 5. Build on this initiative to start developing a data culture

- Ensure that data is regarded as an asset of the business as a whole. There has to be a joined up approach between departments, and a company-wide commitment to assure good data quality across the enterprise.

- Question internal assumptions, with a view to making it the norm to ask for the evidence to support any views expressed. Assist with the due diligence to verify any related claims.

- Encourage innovation on data within the business, such as testing new data sources to explore alternative insights.

- Tolerate failure: where evidence emerges that a previously held view was wrong, ensure that those with an emotional investment in the position do not have a disincentive to accept the new insight.

- Remember that data is often a sensitive and valuable asset. It is important to respect confidentiality and apply the highest standards of business ethics and governance in the way that it is handled.

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## Further resources

Rebooting business: valuing the human dimension

Unlocking business intelligence: the role of management accountants

Building resilience: an introduction to business models

Strategy mapping tool

How to develop non-financial KPIs tool

How to manage customer value tool

For more information and resources visit **cgma.org**

# About this report

This CGMA report focuses on the critical role to be played by management accountants in delivering commercial impact from the growing volume of data that is now available to organisations.

The report has been written by Longitude Research and draws on research conducted by Peter Simons and Tarisai Masamvu at CIMA and Paul Parks at the AICPA including a survey of 2,093 CFOs and other finance professionals, working in a broad range of business sectors across more than 80 countries. The survey was conducted in August 2013. It also makes use of a programme of interviews with senior finance executives including:

- David Axson, Managing Director of Management Consulting, Accenture

- David Burgess, Vice President Revenue, Finance Operations, Shell

- Jaroslaw Chrupek, Global Data Manager, British American Tobacco

- Martin Fitzpatrick ACMA, CGMA, MSc, MBA, Vice President Finance, APAC, Qliktech

- David Geere ACMA, CGMA, Consulting Manager, Deloitte

- Gwyneth Gittings, Vice President, Global Segment and Management Reporting, American Express

- Matthew Keylock, Global Capability Managing Director of Data, dunnhumby

- Bernard Marr, Author and Enterprise Performance Expert

- James Miln ACMA, CGMA, Senior Finance Director, Global Operations Finance, Yahoo!

- Ray Murphy BA Hons, FCMA, CGMA, Head of Sales Analytics and Systems Solutions for Global SME Customer Acquisition, Google

- Gustavo Penas, Finance Operations - VP Controller, Shell

- Joe Peppard, Professor at the European School of Management and Technology in Berlin

- Arthur Tan, Senior Director for Business Planning, Worldwide Studios, Sony Computer Entertainment

- Malcolm Wilkinson, Partner, Deloitte

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The Association of International Certified Professional Accountants®, a joint venture of AICPA and CIMA, established the CGMA® designation to elevate the profession of management accounting globally.