CGMA® REPORT

BUSINESS ANALYTICS AND DECISION MAKING

The Human Dimension

Chartered Global Management Accountant (CGMA®)

Two of the world's most prestigious accounting bodies, AICPA and CIMA, have collaborated to establish the Chartered Global Management Accountant (CGMA®) designation to elevate and build recognition of the profession of management accounting. This international designation recognises the most talented and committed management accountants with the discipline and skill to drive strong business performance. CGMA® designation holders are either CPAs with qualifying management accounting experience, or associates or fellow members of the Chartered Institute of Management Accountants.

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1. INTRODUCTION

The importance of decision making

Globalisation means businesses across the world have access to similar resources, including materials, components, products and even people. As businesses also use similar technologies, competition is causing business processes to converge towards similar standards. This is leaving the quality of a business's decision making as its main means for out-performing its competitors.

Digitisation, meanwhile, is driving down costs and causing commoditisation. Intangibles enable a business to differentiate from its competitors. They are already the main drivers of the value that a business can create[i]. The quality of its decision making enables a business to adapt more swiftly than its competitors to the opportunities and threats presented by the digital age and the developments in its markets. It is also the key intangible that unlocks the potential to develop other intangibles within the business, such as its competitive position, its brand's reputation, the quality of its people, its intellectual capital and how well it implements its decisions.

Businesses must therefore address the risk of bias in decision making by ensuring that their decision makers do not unnecessarily exercise personal judgement based on past experience or swayed by personal motives. Instead, they should aim to be measured and rational. Decisions should be based on evidence provided by relevant information and on diligent analysis with a focus on stakeholder value. There should also be transparency and accountability in decision making to encourage a culture of shared objectives and mutual trust, fully consistent with the Global Management Accounting Principles[2].

Personal opinions and hunches are still important but they should be considered in the context of what the data now available tells us. Artificial intelligence can generate algorithms and identify correlations, but there is still a need to add this human dimension to generate insights.

The evolving role of the management accountant

The role of the management accountant is changing to provide better support for decision making and performance management. The production of standard reports (such as end-of-month financials, variance analysis, KPIs and regulatory filings) is becoming ever more automated. At the same time, due to the competitive environment, demand is growing for management accountants to provide ongoing 'insight', not from financial data on its own but in combination with non-financial data as well, both internal and external to the business and sometimes including 'big data'[3].

Unfortunately, many people have sought to overcome the challenges associated with data and analytics in the mistaken belief that, with the right technology, new insights and better decisions are almost a given. Yet analytics actually has very little to do with technology. Yes, there might be technical issues to address, such as getting access to data, combining data sets or integrating financial data with data generated from social media or 'connected things'. However, no analytical tool can do more than augment or complement what is a cognitive and sometimes social process. Generating insight is an inherently human trait.

It is people, not technology, who make sense of data and give it meaning. This means that business intelligence resides not in the data warehouse but in the minds of people.

The recent CGMA report – *Joining the dots: Decision making for a new era*[4] – highlighted how many companies are struggling to translate data into insight and build the decision-making skills of their senior leaders.

Management accountants are ideally positioned to help a company focus on gaining insight from data. While many organisations are likely to have pockets where analytics is already taking hold, accountants' overview across the organisation and their focus on financial performance enable them to bring an objective 'big picture' perspective. However, there is a danger that they could forfeit this privileged position unless they go about it in the right way. This report seeks to provide guidance.

"We held a recent roundtable of CFOs of US public companies and found that "adding insight to the numbers" was in the top three issues they felt were most urgent. They cited competition and business model shifts as the drivers for data-driven analytics across their business units and the need for their management accountants to play a lead role in these efforts."

Tom Hood, CPA, CITP, CGMA,
Maryland Association of CPAs and
the Business Learning Institute
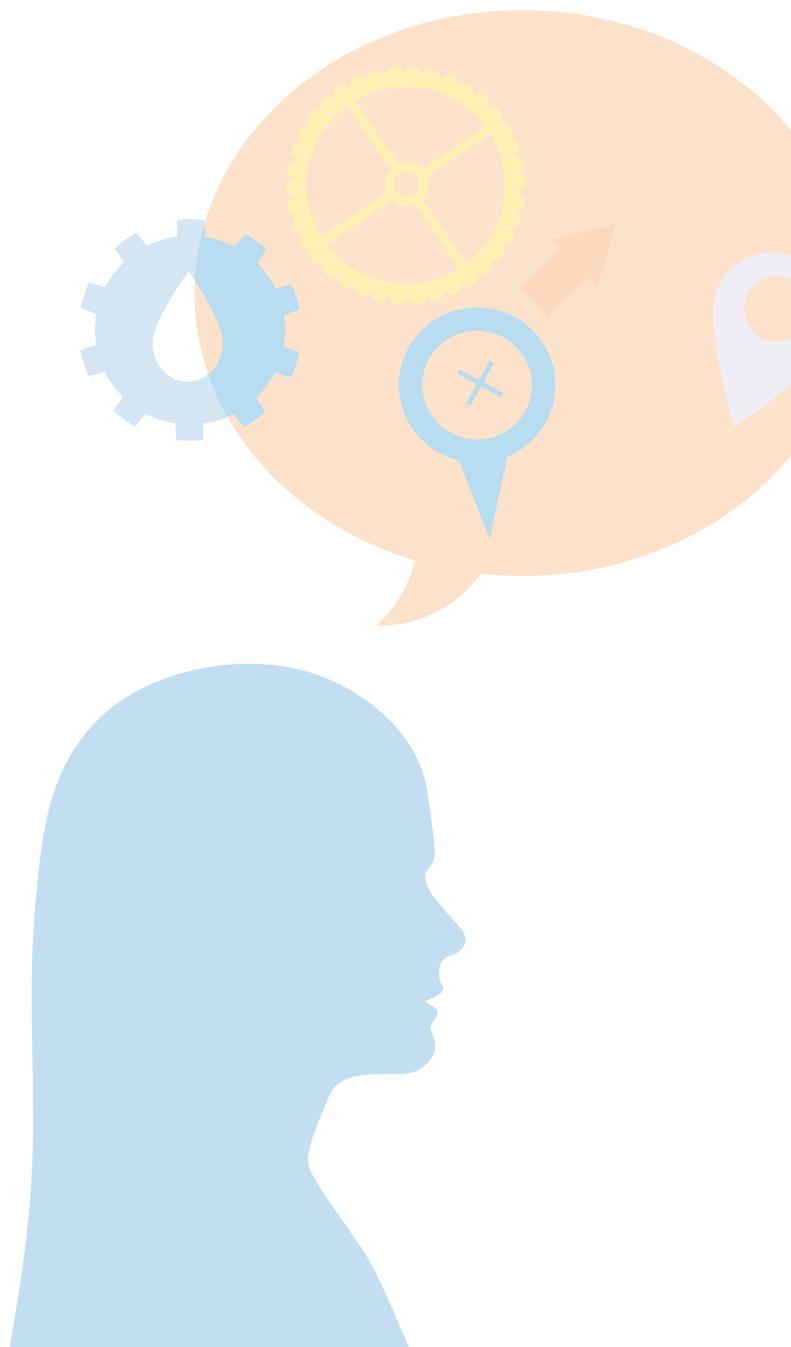
2. DIMENSIONAL ANALYSIS

Definitions

'Dimensional analysis', 'business analytics' or 'segmentation analysis' are terms used to describe how business analysts and management accountants look at data from various directions. This means they can analyse performance by dimension – such as by product, by process, by customer segment or by delivery channel. The objective might be to better understand performance in terms of what has happened, or why, or to identify what might happen or how to improve performance. It often involves constantly looking for incremental improvements or innovations to ensure the business's resources are deployed where the returns or prospects are best.

Business analytics aims to generate knowledge, understanding and learning – collectively referred to as 'insight' – to support evidence-based decision making and performance management. As an umbrella term for an evolution that began many years ago, it refers to the competencies, processes, technologies, applications and practices involved in achieving these objectives. However, people can be confused by the overlapping of concepts and terms with seemingly similar meanings, sometimes intentionally driven by technology vendors and others with vested interests. (See box opposite for guidance on some of the most common terms.)

Decision making in businesses today is moving to the point where accepted practice is about first understanding the numbers and what they are revealing, and then using this insight to drive intelligent business decisions. This replaces the approach where people take the action that feels right and then examine the numbers afterwards to see if it worked. Insight, therefore, should drive decision making. But insight also has a broader role to play in the landscape of organisations.

The types of questions that can be addressed by analytics initiatives

1. WHAT happened (descriptive)?

This question seeks information describing a situation, event or the status of an asset or product (such as location or temperature) to set out what has happened. For a law firm, for example, this might involve reporting client revenue for the last quarter. 'What' questions are usually answered in canned (or pre-defined) reports?

2. WHY did it happen (diagnostic)?

This aims to enable understanding of the reasons why an observed event actually took place. It might necessitate undertaking some root-cause analysis or using data to test a hypothesis. For example, if a law firm is experiencing reduced billings with a particular client, it is about understanding the reasons in order to work out how to reverse the decline (i.e., to make a decision).

3. WHEN might it happen (predictive)?

The task here is to understand how to predict when a future event is likely to happen. This will generally require building a model. First, the component parts will need to be identified, before determining from historical data how they all fit together. Historical data can then be used to see if the model is a good predictor of outcomes that have already been observed. For example, Rolls-Royce has collected petabytes (one thousand million bytes) of telemetry data on the performance of its aeronautic engines. It can now examine this data to predict the likelihood of certain components failing and schedule maintenance accordingly. On a smaller scale, a retailer might seek to predict the additional sales generated by particular types of promotions.

4. **HOW** I can make it happen (prescriptive)?

The main challenge in predicting events is often in creating the mechanism through which people or events might be influenced. This is usually achieved through experimentation. For example, online retailers might do A/B testing (comparing the performance of two versions of a web page) to determine which design is most likely to convert visits to real sales. A mobile phone operator might wish to nudge customers towards using channels that cost less to service. Or a tax authority might want to find out whether a particular form of words in a tax demand more effectively influences taxpayers to pay their outstanding liabilities on time.

Rational decision making

Decision making is often presented as a rational process, in which individuals make decisions by collecting, integrating and analysing data in a coldly rational, mechanistic way. However, research has long shown that this is not how people make decisions. Decision making is a dynamic, contextual and personal/group activity in which prior knowledge and experience are recalled and combined with information.

Most organisations rely on individuals to make rational judgements that are based on data. Yet outcomes from psychological experiments exploring this area suggest that people will frequently fail to do so. What is really interesting is that they fail to do so in systematic, directional ways that are predictable[6].

In addition, evidence has been accumulating since the 1950s that the individual's ability to handle large volumes of data is limited.[7] So it is by no means guaranteed that providing large amounts of information enables better decisions to be made or generates insight. One study found that decision makers may not use IT tools to increase their use of information and so improve the quality of their decisions.[8] Instead, they may use technology to reduce the amount of mental effort needed to make decisions. Other studies have found that managers often lack awareness of the existence and relevance of the many diverse and often dispersed data sources available to them. They have also pointed to the social aspects of decision making as reasons why information and IT are not always used in 'rational' ways.[9]

Jargon buster

Business analytics is an evolution of a practice that in the early 1970s was called decision support systems (DSS)[5]. However, in some organisations, business analytics is used interchangeably with business intelligence (BI) (although, confusingly, analytics is often seen as a subset of BI). Other terms also overlap with analytics – here are a few of them:

Business performance management (BPM): an approach that allows the monitoring, measurement and comparison of key performance indicators (KPIs).

Data mining: a computational process of discovering patterns in large data sets. It involves using methods at the intersection of artificial intelligence, machine learning, statistics and database systems.

Data science: an interdisciplinary field concerned with the processes and systems used to extract insights from data. It is a continuation of other data-analysis fields including statistics, data mining and predictive analytics.

Data warehouse: a large repository of organised data.

Extract transform load (ETL): a process in data warehousing responsible for extracting data from the source systems and placing it into a data warehouse.

Machine learning: a method of data analysis that automates the analytical model-building process. Using algorithms that iteratively learn from data, machine learning allows computers to find hidden insights without being explicitly programmed on where to look.

Meta data: the tagging of data, providing a description for the purposes of management and analysis.

Online analytical processing (OLAP): the multidimensional analysis of business data, providing the capability for complex calculations, trend analysis and sophisticated data modelling. It is often seen as part of the broader category of business intelligence, which also encompasses the relational database, report writing and data mining.

Predictive analytics: a process that attempts to make predictions about unknown future events using techniques including data mining, statistics, modelling, machine learning and artificial intelligence to analyse current data.

Bias in decision making

People also have individual biases (see box below). As well as carrying their own personal assumptions that influence their thinking processes, they have cognitive filters that shape how they interpret information and respond to cues.[10] Furthermore, people's responsiveness to environmental signals means that their decision making, particularly at senior management level, tends to be more driven by events and issues than systematic and evidence-based. 'Gut feel' often replaces any rigorous analysis and managers tend to revert to familiar reasoning when making decisions, particularly when under pressure.[11]

Biases and assumptions

Research on cognitive bias is particularly relevant to analytics. A cognitive bias is a pattern of deviation in judgement that occurs in particular situations, leading to results including perceptual distortion, inaccurate judgement and illogical interpretation.[12] Common cognitive biases found when people engage with data include:

- **Framing:** interpreting the situation or issue too narrowly and not considering the bigger picture can cause people to overlook potential causes or consequences.

- **Hindsight bias:** the inclination to see past events as being predictable (sometimes called the 'I-knew-it-all-along' effect).

- **Fundamental attribution error:** the tendency for people to over-emphasise personality-based explanations for behaviours observed in others while under-emphasising situational influences on the same behaviour.

- **Confirmatory bias:** the tendency to search for, or find more credible, information that confirms one's beliefs or supports a preferred course of action.

- **Self-serving bias:** the tendency to claim more responsibility for successes than failures. It may also manifest itself as a tendency for people to evaluate ambiguous information in a way that benefits their interests.

- **Belief bias:** when a person's evaluation of the logical strength of an argument is biased by his/her belief in the truth or falsity of the conclusion.

REAL-WORLD ANALYTICS

Leaders in analytics out-perform their rivals

Many established companies have built an analytical capability. They have also demonstrated a clear link between company performance and the effective use of data to generate insight for decision making.

Figure 1 illustrates how big data extends beyond the financial data that has long been the basis of the accountant's role in business. Big data also includes enterprise data that is either captured by the business's systems and people or is bought in (perhaps from providers of market analysis or benchmark services).

It extends yet further, on to the vast range of new forms of complex, often unstructured, digital data that are now available.

Accountants' focus has traditionally been on financial data, but management accountants in leading businesses are now considering other forms of data. For example, companies need measures to enable them to manage intangibles. Management accountants apply integrated thinking to 'join the dots' and make connections between financial outcomes and pre-financial measures. These can then be used as leading indicators, usually based on causal relationships, connections or correlations.

Joining up the dots

FIGURE 1: Big Data[13]
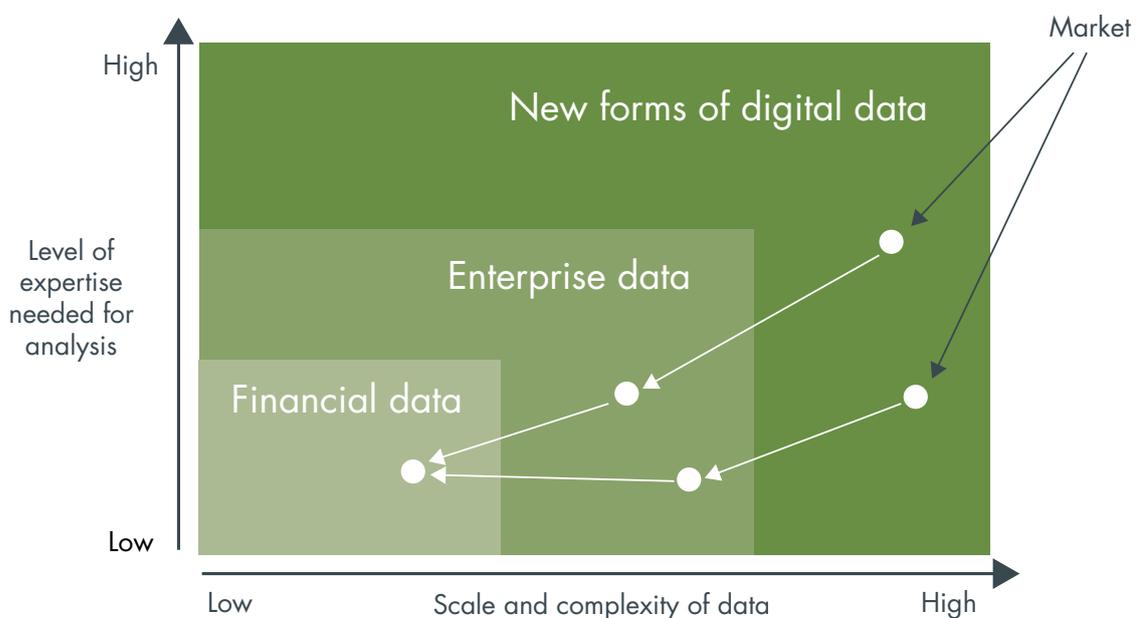
At Unilever, for example, the finance function has created a data dashboard that draws upon a diverse set of sources, from social media through to market research agencies, to provide a set of KPIs that are globally relevant, consistent and tangible. Critically they can be linked back to P&L reporting and cash flows.[14]

Some people may have the impression that analytics is a matter for internet businesses that base their strategy on their ability to analyse vast amounts of data. However, in a series of interviews conducted to inform this report, Professor Joe Peppard of European School of Management and Technology (ESMT) Berlin found that management accountants across a wide range of sectors are engaged in analytics.

FMCG (Fast Moving Consumer Goods) sector

"Effective sales and marketing campaigns are vital to the success of all FMCG businesses in their drive for market share. So it is of paramount importance for us to understand and interpret the efficiency of this spend. Our Finance Business Partners play a pivotal role. They work closely with our sales and marketing colleagues to ensure that promotional-spend decisions are properly evaluated against promotional guidelines and will lead to an increase in shareholder value.

The ultimate ambition for analytics solutions is to support this process with a two-tiered strategy. Among other factors in the continued war on waste, analytics solutions need to automate promotional calendars, enable the analysis of promotional plans' impact on brand P&L accounts and provide up-to-date reporting of promotional performance versus targets.

The real value-added contribution that analytics can make to any business is to support decision making in the promotional evaluation process. Analytics solutions will truly prove their worth in being able to model and scenario-plan promotional activities at a macro and micro level, and in providing guidance that suggests which promotions provide the most value for both the customer and the business."

CIMA member and CGMA designation holder in a senior analytics role with a global FMCG business

Technology sector

Aongus Hegarty, ACMA CGMA, EMEA President, Dell, explains how Dell has shifted from a product to a service-focused business model and recognises the limitations of purely financial data in support of this strategic focus.

> "Dell collects data on a range of elements including: customer satisfaction and loyalty using the Net Promoter Score (NPS), competitive environment, corporate social responsibility (CSR) activity and perceptions of the brand in the marketplace. And customer satisfaction itself is broken down into 15 different interface points with customers: for example, account relationship, post-sales experience, customer support, point of sale and online experience. Some of this data comes from internal sources, and some is sourced from external parties. We also collect employee feedback via surveys, capturing data on items such as diversity and inclusion through participation in employee resource groups (ERGs), engagement in the community and development opportunities within the organisation. While much of this data is capturing intangibles, our leadership team believe that they have a strong impact on business performance."
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> **Aongus Hegarty, FCMA CGMA,**
> **EMEA President, Dell**

With this change in business model, Dell sought to clearly understand how diversity and inclusion, CSR and professional development opportunities are linked to employee motivation, customer satisfaction and business results. They hypothesised that you drive better engagement by having more inclusive teams. Having tested this hypothesis with data, they then moved on to link it to the business's financial performance. Ultimately, they built a model based on the premise that if you have a more engaged organisation driving greater diversity and inclusion, you end up having more motivated and engaged employees. If there is a customer in an employee resource group's portfolio, all this can be tied back to customer satisfaction and financial performance. Today, these are all metricised and measured and the company sets targets against them.

Telecoms sector

Telecommunications companies (telcos) recognise the importance of customer understanding in developing and growing their business. The industry long ago moved away from a situation where success was a 'volume play': essentially, attract more customers and keep costs down. Even a decade ago data was very much a secondary thought – operators used a 'walled garden' approach, restricting subscribers' access to knowledge and choice, and dictated content and how customers interacted.

> "In this new competitive landscape, we have recognised very early that financial metrics don't help in understanding customers. Moreover, with many millions of customers, averages don't hack it when making decisions, particularly strategic ones. Today, accountants spend much of their time working with business colleagues exploring information not solely sourced from accounting or billing systems. Essentially they are seeking to identify and knit together relationships between customers, their behaviours and financial performance."
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> **Simon Henry FCMA CGMA,**
> **CFO, Three Ireland**

In the past, revenue, average spend per customer and margin were the primary metrics used in the telecoms sector. Today, telcos seek to understand the customer life journey: how and when they became customers, the device (or devices) they use, the type of contract they hold, their contact centre usage and feedback, and their behaviour: do they self-serve, do they buy concert tickets, do they travel abroad frequently, are they part of the company's loyalty programme? They also use information from their network such as customers' propensity to interact online (using voice, SMS or webchat), their top-up frequency and the channels they use (such as for top up).

Ultimately, everything is tied back to the performance of the business and financial outcomes. When telcos segment their customer base, they try to understand what they spend, their behaviour (do particular customer segments buy in different ways?) and relate this back to financial performance. For example, it is cheaper for the telco if pre-paid customers top up on an ATM machine or website instead of a supermarket or store. They therefore use data to analyse how to drive such customers to top up using cheaper channels.

Pharmaceutical sector

With accountants working across different businesses, a global pharmaceutical company has built a model to capture and report the operational savings that country and regional managers achieve in different business environments. The model is used to bonus staff. It takes into account the 'headwinds' affecting individual circumstances, potentially demonstrating that the savings an executive committed to deliver were actually delivered but wiped out by factors beyond their control.

> "Building such a model requires understanding of the various pressures within the different countries – for example, inflation – that can impact the delivery of operational savings. The analysis requires that data is obtained from a large number of sources and that there is the capability to build models to make sense of data. It is also important for those not involved in its construction, but who will be impacted by its outcome, to understand and make sense of it."
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> **Finance Manager Analytics**
> **Global pharmaceutical company**

Retail sector

A major UK retailer has recently established a Financial Analytics Centre of Excellence in its finance function to promote and facilitate greater use of data right across the business. This new unit is both to bring data science to mainstream financial activities and to be a catalyst in transforming a traditional finance organisation into what the company refers to as 'a new age' one. The unit seeks first to rapidly analyse and visualise data, then to help managers from across the business make sense of it and use it to support decision making. This might involve mixing customer-basket data with loyalty-card information to gain new insight into customers and their buying patterns. As you might expect, the team works with massive data sets. A single month's-worth of data can exceed 100 million records. In a recent project, they worked with several hundreds of millions of records.

A key objective for the unit is that requests for support in improving overall knowledge of the business should come from senior levels in the organisation. Its Senior Manager Finance Analytics tells us that when the team was initially set up they were not getting many such requests.

> "The unit felt that managers did not know what analytics could offer them, so they demonstrated to them some of what they could do such as predicting and clustering things, and did demos at various finance forums. Direction for this early work came from over-arching problems that, as a business, they need to continually address to improve profitability. For example, wastage reduction is a key priority. From historical data, the team worked to identify the factors that affect wastage and the relationships between them. Is there a relationship between wastage and level of unsold stock at the end of each day? Is it a linear relationship? What type of curve is it if you map the variables? Are there other factors that affect wastage other than store size or day-end stock levels?"
>
> **Senior Manager Finance Analytics**
> **Major UK retailer**

Managers are beginning to understand the capabilities of analytics, and the unit is receiving a steady flow of requests. They may come with a hypothesis that needs testing or particular assumptions that need to be explored. Often, a manager may just have a hunch about something and either wants it confirmed or to better understand its nuances and the situations where individual assumptions break down.

At the start of a project, members of the analytics team often meet with business-facing finance teams to identify those factors that could be affected. Then, using machine-learning algorithms (or possibly conducting a simple multiple-regression analysis) they seek to learn if there are any relationships between those factors and, if so, what they are. By determining the statistical significance of results, they can see which factors are more highly correlated with outcomes. As this is not prescriptive analytics, the team is careful not to say that something 'is caused by' a particular factor, merely that it is correlated to it. In addition, they don't suggest what should be done – they simply use visualisation tools to report what has been observed. They are conscious that it must be managers who then make sense of an analysis and base decisions upon it.

Forecasting is a key output from the finance function of a business (such as sales, costs and more). Instead of using an army of financial analysts, the company is planning to use predictive analytics for forecasting. A recent example is a project to forecast daily sales at store level – another is a project to identify the factors that influence store performance. They use historical data to search for patterns (pattern recognition) to determine what these might be and how they might influence performance. Given the massive volume of data, they use machine-learning technologies to do this.

In the process, all previous years' day sales data across all their stores, all promotional activities undertaken over this period and other potentially relevant internal information are combined with external data such as the weather conditions and macro-economic factors (including inflation and disposable income). All this data is fed into an artificial neural network and learning algorithms 'to learn' the relationships between these variables and identify how they affect sales. The first-cut analysis achieved 92% accuracy. The team recognises that more fine-tuning is required for the model to be accepted. They are now working at getting this figure up to 98%; once there, they will use this model to forecast sales and help with matters including budgeting and rostering.
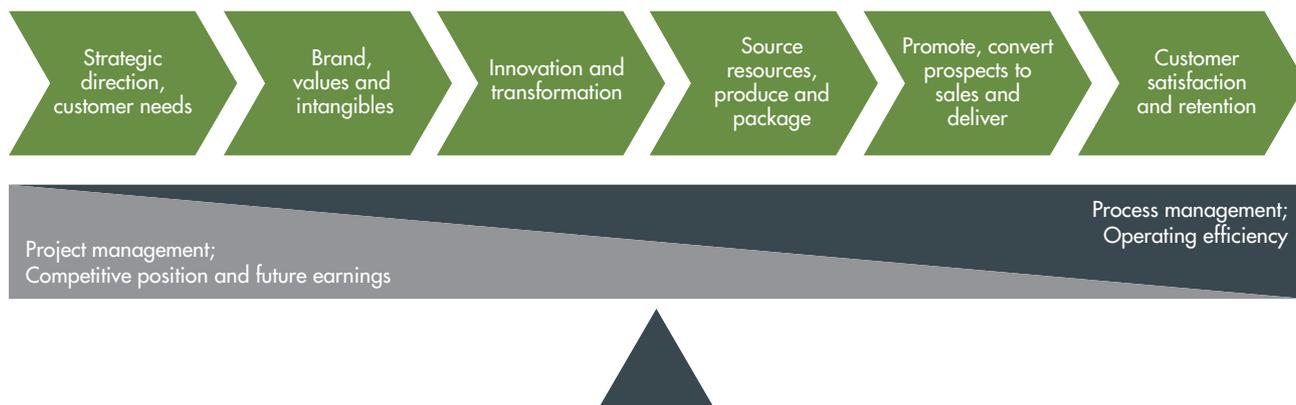
Recommended actions

Analytics is still an emerging discipline so we cannot provide a definitive list of the actions that businesses should take. However, some common themes have emerged from our interviews:

1. All interviewees had a clear understanding of their business, its strategy for the future and what it needs to do to generate value.

2. They have all given considerable thought to how to 'join the dots' and identify causal relationships to determine what measures and analysis are important to manage the business's performance.

3. In many businesses, data tends to reside with the 'owner' of the process that generates it; our interviewees, however, were alert to the data available across their business.

4. Sometimes data owners provide analysis of their own data, and organisations may have pockets of expertise in analysing data. Best practice, however, seems to be to have one centre of expertise, either within or working alongside the finance discipline, and a culture that allows the sharing of information across disciplines.

5. There is an interplay between insights and decision making. Insights are required to inform decision making. But investigation and deliberation can provide new insights, about customer behaviour for example, that can lead to a need to take a decision.[15]

6. Artificial intelligence and machine learning can identify relationships and patterns but there is still a need for the human dimension to interpret this information.

7. Collaboration with business colleagues was a recurring theme. In order to convert analytical insights into commercial outcomes, people have to work well together across disciplines.

Where to start

Analytics is often about exploring data to generate new knowledge and insights. However, considering defined questions and the data known to be relevant to answering them can provide a good starting point[16]. For management accountants, given their focus on financial outcomes, the measures and data needed to manage the performance that leads to those outcomes is a good place to start.

FIGURE 2: CGMA Balanced Value Chain[17]

| Strategic direction, customer needs | Brand, values and intangibles | Innovation and transformation | Source resources, produce and package | Promote, convert prospects to sales and deliver | Customer satisfaction and retention |

Process management; Operating efficiency

Project management; Competitive position and future earnings

The CGMA Balanced Value Chain is an aid to framing the conversations needed to work out what performance measures and data analysis are most relevant to a business. It combines concepts from the Value Chain developed by Michael Porter and the Balanced Score Card developed by Kaplan and Norton.

Generating value for shareholders over the long term is a greater challenge than delivering this year's budget. It is not just about achieving financial outcomes – it also involves maintaining a balance between achieving current performance targets and developing the business's competitive position for the future. Achieving both at the same time requires more advanced performance management than cannot be achieved using financial measures alone. It requires a keen understanding of the drivers of cost, risk and value across the business's full value chain. Financial outcomes are outcomes – they arise after the value chain.

Pre-financial measures are needed to manage performance all along the value chain:

- This generic Balanced Value Chain begins with a plan to meet a customer need and ends with satisfied customers. Customers' perceptions, customer relationships, the customer experience and, in due course, customer satisfaction are important intangibles for any business.

- Intangibles such as the values conveyed by the business's brands or other intellectual property that the business owns or develops underpin its potential to generate value in the future.

- The business will have a number of current or ongoing projects to help it develop its competencies and competitive position for the future. Measuring and managing the progress of these projects is a priority for the future.

- Every business will have a number of key processes relating to inbound logistics, internal processes and outbound logistics that must be measured so as to be managed.

- Marketing activities can be expensive but a brand's reputation is an intangible that can be an important driver of value. Performance management is always a challenge in this area.

- As customer satisfaction is the most important intangible, progressive businesses have measures for the quality of the experience at each stage of the customer journey.

Outcomes can seldom be used as timely measures of recent performance. Potential leading indicators and non-financial metrics are needed to measure performance that will lead to future outcomes. Comparable descriptors of what can be regarded as satisfactory, at risk or unsatisfactory and traffic light indicators may have to suffice for what cannot be readily quantified.

Determining the measures and what data to use to manage performance requires an ongoing dialogue that prompts further analysis, providing new knowledge that continually refines and clarifies a shared understanding of how the business creates value.
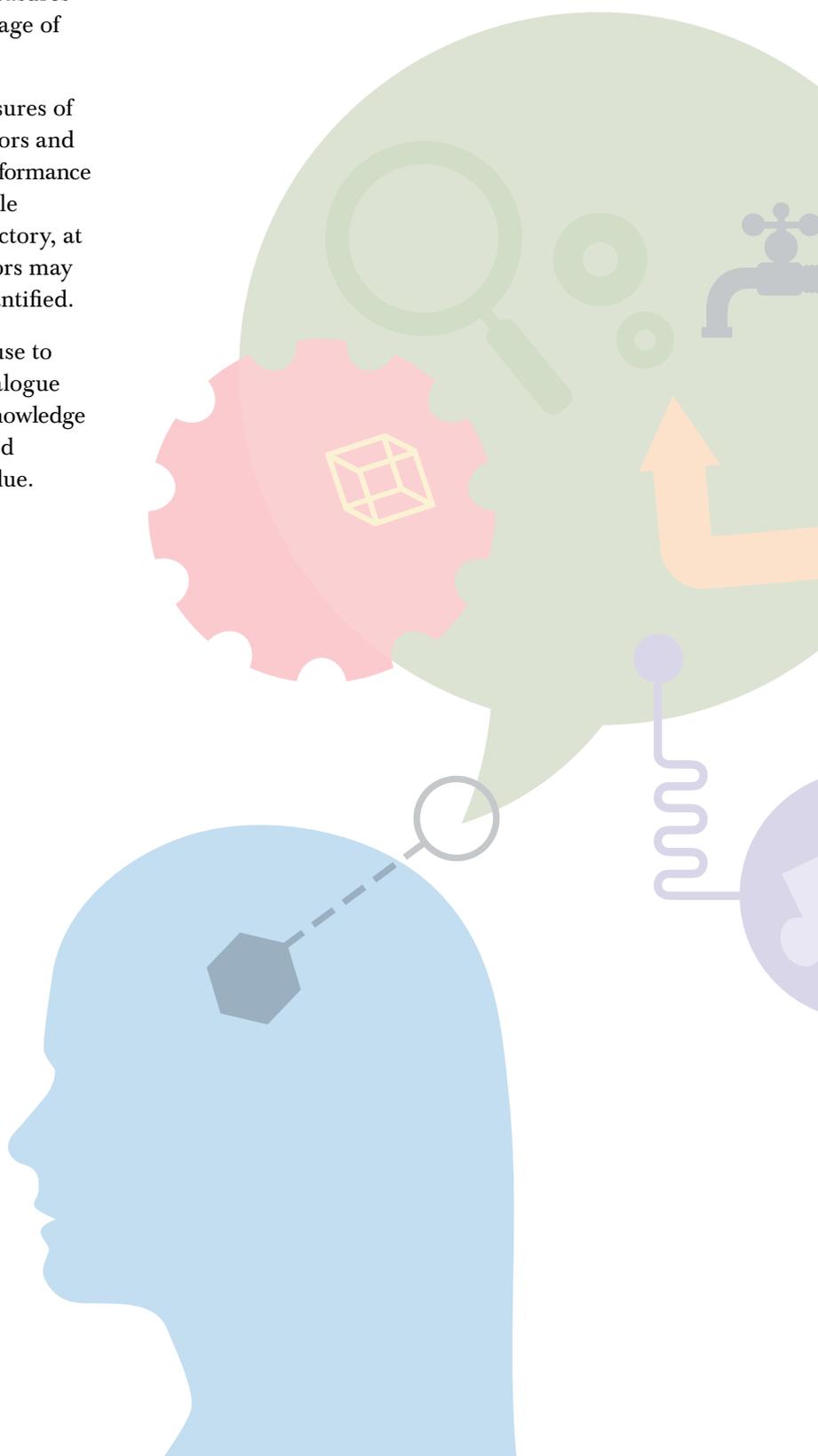
4. CHALLENGES IN WORKING WITH DATA

Companies such as Google, Facebook, Netflix and Amazon are built on foundations of data exploration. Longer-established firms tend to be less able to harness the power of information. While IT has greatly expanded opportunities to collect, store and process data, how to improve the use of data to make informed, fact-based decisions needs to be seen through the lens of people, not technology. It requires a deeper understanding of how, through the use of data, insight is generated. Just as providing someone with a hammer does not make a carpenter, deploying IT tools does not automatically improve decisions or the process of knowledge discovery.

The reality is that many organisations are struggling to take advantage of the new opportunity to access new sources of data, conduct advanced forms of analysis and enable evidence based decision making. A number are even questioning if there is anything to gain from analytics, with some research showing that competitive advantage from analytics is waning.[18] The reason? As companies have been increasingly finding out, analytics is not easy – it demands considerable effort and commitment. There is a human dimension. It needs a new mindset and skillset right across the business, which can be difficult to achieve. However, those that persevere are seeing beneficial business results.[19]

Working with data: an inherently messy process

As we have seen, technology has usually been deployed to make more or better information available[20] despite the fact that managers may discard information, no matter how good it is, because of their particular biases or inappropriate assumptions about using the information.[21] The reality is that analytical tools merely augment human cognitive processes: they don't make decisions and they don't generate insight.

This does not mean that people should not hold a different perspective on the same data. For example, a digital marketer and an accountant might see and interpret the same dataset in different ways; this is the power that a cross-disciplinary team can bring when exploring data together. The process through which insight emerges is often a social one.

Communicating insights: telling a story

After all the data extraction and gathering, data cleansing, data integration, hypothesis testing and model building, the biggest remaining challenge often lies in communicating the results in a convincing way. While most accountants are comfortable with numbers and spreadsheets, other colleagues may be less so. This means an audience can often struggle to see trends and patterns and make sense of any analysis. Consequently, presenting results is usually best achieved by stories and pictures rather than numbers. The key requirement is to be able to take people on a journey. While visualisation tools are becoming central to the presentation of results, storytelling is also a necessary element of conveying understanding and helping the audience to make sense of any analysis.

5. IMPLICATIONS FOR MANAGEMENT ACCOUNTANTS

A recent CGMA report, *Finance Business Partnering – the conversations that count,*[22] explored this evolving role. It emphasised that questions and conversations (communication and storytelling) can lead to the insights needed to improve performance. As business expectations change and roles evolve to reflect these changing expectations, a new skillset is required.

Some will already possess these skills. Others will need to work at developing them – not only is there a growing requirement to operate outside the traditional boundaries of the accountant's role, these skills are above and beyond accounting training. According to the research undertaken for this report, the following qualities can be seen as critical capabilities:

Curiosity. Success with analytics demands adopting a probing and questioning stance – this is how insight comes about. It also requires being prepared to challenge the status quo. So consider what factors might be having an impact on what is observed, identify possible causes and effects, and get to root causes (even if only with an initial theory that can be tested). Sometimes being curious might entail considering how to represent the data differently so as to reveal a new insight.

Deep understanding of the business context. It is no longer possible for accountants to hide behind the numbers. It is imperative to understand the key business drivers and the commercial and business challenges the organisation faces. Understanding the enterprise's commercial context is also important in conducting and challenging any analysis. Moreover, this deep understanding is necessary for the accountant to be able to identify relevant non-financial data, understand how it relates to business performance or build predictive models that take non-financial factors into consideration. To develop this competence, you might need to gain experience of different business areas as you develop your career.

Openness to embracing change. Change is a constant in this Volatile, Uncertain, Complex and Ambiguous (VUCA) world. The nature of analytics is to affect future performance. What worked today may lead to disastrous results tomorrow. Consider the impact of new insights on the change agenda. Assumptions about customers, competitors, channels, products and more should be constantly challenged.

Ability to think in systems. When you build a model, it must be as comprehensive as possible. It is important to identify and understand all the necessary components and how they might fit together; this can only come from having a deep understanding of the business as well as the ability to think in systems. (A system is merely a representation of how variables interact with each other and influence the issues being examined.)

Relationship builder. A good relationship is often the pre-cursor to successful partnering with business colleagues. Relationships are usually based on trust; in their favour, accountants are recognised as bringing a recognised objectivity and rigour that is honed by their professional training. The accountant is regularly the facilitator for driving insight. This can often require building credibility that extends beyond being seen as the 'number cruncher', possibly entailing empathy with business colleagues and with the challenges and pressures that they face. This can mean being proactive rather than reacting to their requests: non-accounting colleagues often 'don't know what they don't know' in relation to the capabilities of data and analytics, and the management accountant is well placed to open their eyes.

Courageous and resilient. Given their professional objectivity, accountants can legitimately hold a mirror to the business and challenge managers (provided they use objective data and rigorous analysis). Yet they may need to be persistent in the face of pushback from the business. Being able to make a recommendation while arguing and illuminating both sides of the argument is often valued.

Strong communicator. No matter how sophisticated the analysis, it is important to be able to tell the data's story in a way that is understandable and believable. This extends beyond face-to-face interactions and formal presentations to include email and other forms of communication. Learn how to effectively present data visually in a way that is not misleading.

The clear message for management accountants is that they must look beyond IT tools to consider the human dimension when aiming to solve their problems with big data. Doing so will make them and their organisations more data driven, both in their quest for insight and in decision making. New competencies and skillsets will be required.

Accountants are not expected to know all the answers. Insight is ultimately co-created with business colleagues. Yet getting engagement from colleagues in the early days of an analytics push can often be a challenge. Often, they simply do not understand or appreciate the role of analytics or the possibilities that they have to offer. In such cases, the accountant must be proactive in developing the capabilities needed before reaching the point where seeking insight from data is natural managerial behaviour.

> "After surveying over a thousand management accountants, the three skills we see in the greatest demand are: 1) anticipating and serving evolving needs; 2) strategic and critical thinking (which includes the business context); and 3) collaboration and communication to mobilise consent. These are consistent with and reinforce the research in this report.
>
> 'We often say, "what got you here won't get you there". The business world is changing exponentially and management accountants need new skills and new tools to continue adding value and moving into these strategic roles that are desperately needed today. Data analytics, business intelligence and the critical skills identified will help them succeed in a VUCA world."
>
> **Tom Hood, CPA, CITP, CGMA**
> **Maryland Association of CPAs and the Business Learning Institute**

6. BUSINESS ANALYTICS – LESSONS LEARNED

Be clear about what you aim to achieve from analytics. Temper ambition with realism; start small in a problem area of focus (such as waste reduction in a retail environment). Building on early successes, look to become more strategic in your orientation and link to key business drivers.

Break down silo mentalities[23]

Many companies have amassed mountains of data in departmental silos (R&D, engineering, accounting, manufacturing and service operations etc.) which impedes timely exploitation. Hoarding information within business units also can be a problem: many financial institutions, for example, suffer from a failure to share data between diverse lines of business, such as retail banking, insurance, wealth management and lending. This can often prevent such companies from forming a coherent view of individual customers or understanding the links across financial markets.

Be careful with the type of questions you pose

Make sure that your questions are unbiased and unambiguous. Is the purpose of the question to understand what has happened, why something has happened, or to predict something? J. Edwards Deming, father of the quality movement, said: 'If you don't know how to ask the right question, you discover nothing.'

Ask second-order questions

Instead of setting out to create a report that can help the sales staff more easily determine 'What stock should we place on shelves today,' an initiative might begin with the question, 'Is there a better way of deciding on stock replenishment?' By posing these second-order (more open, abstract and less tightly focused) questions, you are immediately assuming that the way decision makers currently operate could be improved.

Strive to show relationships between cause and effect

Seek to draw attention to issues of concern and show how factors, particularly those within the organisation's control, can result in particular outcomes. It is important to move beyond symptoms, addressing questions like: 'What's the problem?' 'Why did it happen?' 'What can be done?' From the data, determine the actions or events that seem to produce certain responses – a task that will usually necessitate building some sort of model.

Probe for what data you do and do not have

Avoid being restricted by the data and systems that are immediately available and accessible. They are limited by today's view of what data is relevant and useable. Use experimentation to test the limits of what you do and don't know.

Team members should have the freedom to be imaginative in seeking opportunities to harness data

We have observed that big data projects often lack creativity and a willingness to try new ways to solve old problems. The lack of creativity is often driven by a myopic view of data and its value to the business. While this can be a function of data silos, which are highly complex to integrate, it more often stems from a reluctance to search for new solutions. This can often have a background in the organisation's culture.

Identify 'exhaust' data and consider how it might be exploited

Data is invariably generated as a by-product of operational, customer and supplier processes. Do you know what this so-called 'exhaust' data is in your organisation? For example, insurance companies use solutions to help them manage their claims-management process. As well as information about the claim, other information may also be created as a by-product of the real purpose of the system, about subjects including claimants' behaviours, the pay-outs associated with particular types of claims and more. Similarly, data from security cameras, primarily used to guard against pilfering, can also be used to track shoppers as they make their way through the store; this can generate data that is of value to merchandisers.

Be ready to reframe the why, what and how of your accepted approaches to business

What do we want to do differently? The team should drive for outside-in, not inside-out, thinking. Be willing to expose your assumptions, biases and blind spots to new and different insights.

Identify the 'appropriate' analytical techniques and tools to enable new ideas and counter-intuitive insights

Have a healthy scepticism for analytical tools and techniques whose results appear too good to be true. Big data and controlled experiments are tools to aid thinking, not substitutes for it. It is people, not technology, who generate understanding and knowledge.
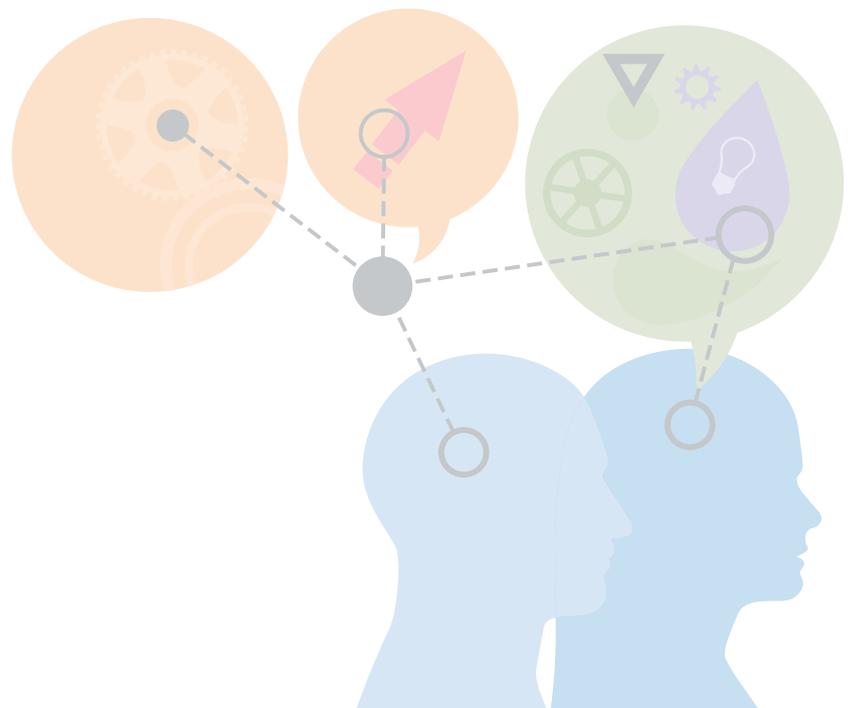
7. CONCLUSION

Early in this report, we pointed out that in most organisations the emphasis with analytics and big-data initiatives is typically on deploying tools and implementing data-extraction processes, which usually seek to improve the quantity, quality, availability and timeliness of information. The person (or people) side of the equation can be all but ignored, possibly apart from some training to use the new tools.

We argue strongly for the need to focus on the human dimension – how people process information, learn, create knowledge and make decisions – acknowledging that creating sense and understanding takes place in the human mind.

Management accounting is a discipline that can bring professional rigour to decision making and management accountants are well positioned to be important contributors of the human dimension that is the foundation of success with analytics.

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FURTHER RESOURCES

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