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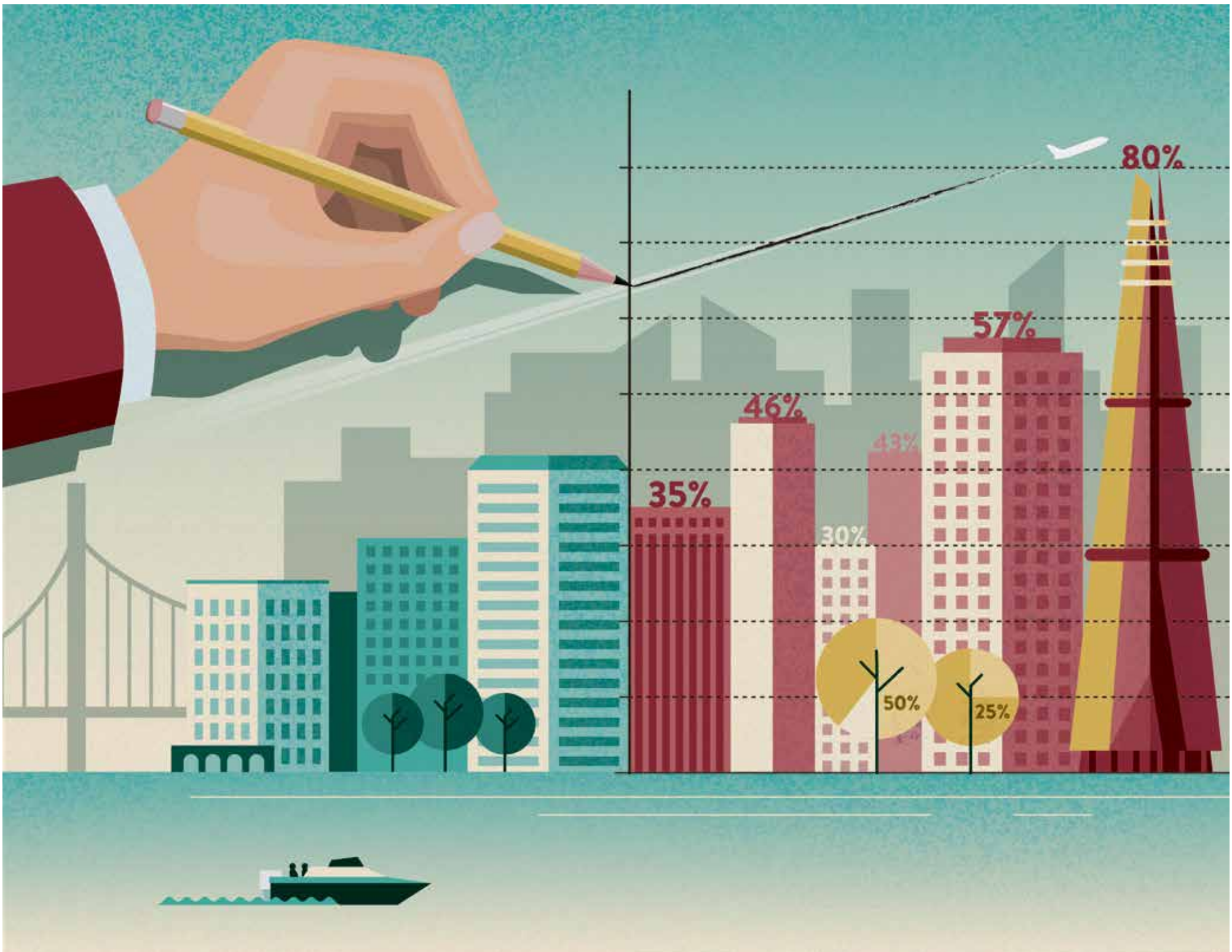
# DATA ECONOMY





# DATA ECONOMY

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Mark Horn / Getty Images

# Data can be worth its weight in gold

Data has been described as the new gold for marketers and innovators who can unlock the customer and business insights it holds

OVERVIEW
MARK SAMUELS

Big data keeps getting bigger. We create 2.5 quintillion bytes of data every day, according to IBM. As much as 90 per cent of the world's data has been created in the last two years alone.

The information that companies collect – whether structured, such as sales records, or unstructured, like customer feedback – can play a crucial role in decision-making processes. Yet to really create a competitive advantage through information, business leaders must promote data-gathering as part of a comprehensive business strategy.

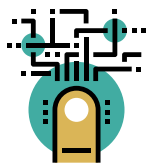
Former chief information officer (CIO) turned digital adviser Mark Ridley says data is a very specific but company-wide asset that has to be considered, controlled and managed. He says it is crucial to recognise that the rise of shadow IT means disparate teams and individuals now hold information on a broad range of systems.

"The tendrils of data spread throughout the business," says Mr Ridley. "To create effective and actionable insights, you have to pull all of those elements of data together into one place, so senior executives can make decisions informed by data at a scale that has never previously been possible."

Increasing numbers of organisations are appointing chief data officers (CDOs) to help manage the data management process. Gartner says the number of CDOs appointed by major organisations rose from 400 in 2014 to 1,000 in 2015. The analyst predicts 90 per cent of large companies will have a CDO by 2019.

The CDO position covers a broad remit, including data governance, decision-making and the creation of business value. Yet the appointment of an executive, no matter how senior, is no guarantee of success. Successful data management remains a fast-moving target.

Interim CIO Christian McMahon, who is managing director at transformation specialist three25, says most companies, particularly those that do not have the IT and financial resources to install a CDO, will never extract the true value within their data. Many firms will struggle to even start the data-sifting process.



**90%**
of large companies will have a chief data officer by 2019

Source: Gartner

"Any organisation that doesn't use data to make calculated decisions and improve their products is not only going to miss the metaphorical boat, but also not be around to catch the next one," says Mr McMahon.

He says value comes from identifying trends and pushing insight to customers in real time. The pressure to create a competitive differential through information continues to grow and some executives could fall short.

"As a business leader, you need to rethink the strategy of how you want to interact and engage with your clients, and that ultimately leads back to what information and data you need to record through your interactions with them," says Mr McMahon.

A key element of an effective strategy relates to data protection. While statistical analysis of big data can be great for businesses and their customers, any impact on the confidentiality, integrity and availability of information can be disastrous.

Harsh penalties exist for firms that intentionally or unintentionally abuse an individual's right to privacy. The European Union's General Data Protection Regulation (GDPR) is due to come into force in May 2018 and will see companies fined up to 4 per cent of their global turnover for breaches.

The UK's recent decision to leave the EU has led some experts to question what the Brexit vote means for data protection, particularly in terms of GDPR.

Hitwise noticed a 33 per cent increase in searches around the terms Brexit and GDPR in the run up to the referendum. "Britain is clearly considering the impact of Brexit on the legislative landscape," says Nigel Wilson, managing director at the data research specialist.

Chiara Rustici, who is an independent GDPR and EU privacy analyst, recognises C-suite executives are looking for a clear "yes" or "no" answer to whether Brexit puts plans for GDPR implementation on hold.

"The question is pressing because it takes longer to do things to data than it takes to state things about data," she says. "Privacy notices can be updated quickly. Changing the IT architecture to handle data portability or erasure across all storage mediums involves resource-intensive, large-scale programmes."

The technical challenges involved leave Mrs Rustici to suggest chief executives and CIOs deserve a crisp, no-nonsense answer, and that most privacy colleagues agree the right response is to keep GDPR implementation on track and to not let Brexit be a distraction.

It is a sentiment that resonates with Tim Holman, chief executive and founder of cyber security consultancy 2-sec, who says Brexit does not represent a "get out of jail free card". He says a UK company will be exposed if it has operations in an EU member state, EU customers or just a splash of an EU citizen's personal data on their systems.

Mr Holman also points to the Extradition Act 2003, which states UK individuals and companies can be extradited for breaking another state's legislation. Not only would a UK company be held liable for a data breach of EU citizens' records, so would its chain of command.

"Does that leave a negligent CEO with a prison sentence, should their company experience a massive data breach? I'll leave you to think about that, but in the meantime plan for GDPR. Plan for it now. Brexit won't stop Brussels putting GDPR into force," warns Mr Holman.

# Cashing in on the value of business data

Exploiting data, whether behind a company firewall or with an open approach, can create value and transform business fortunes, and even encourage the launch of completely new enterprises

DATA AS A COMMODITY

MARK SAMUELS

The risk posed by disruption has created a new gold rush. Senior executives see the impact of data-savvy startups, such as Uber and Airbnb on traditional sectors like transport and accommodation, and recognise the need for affirmative action. In an attempt to avoid being disrupted, business leaders are seeking insight from their data stockpiles.

Researcher IDC confirms this trend, forecasting $187 billion will be spent on big data and analytics technology by 2019, which is a 50 per cent rise from the $122 billion invested in 2015. Yet executives should note that the introduction of a software tool is no guarantee of success. Technology can only transform business performance if the organisational culture changes, too.

Lisa Heneghan, global head of KPMG's CIO advisory practice, says this change in culture represents a significant challenge for many companies. A large proportion of the history of IT management, she says, has been focused on operational service rather than business enablement.

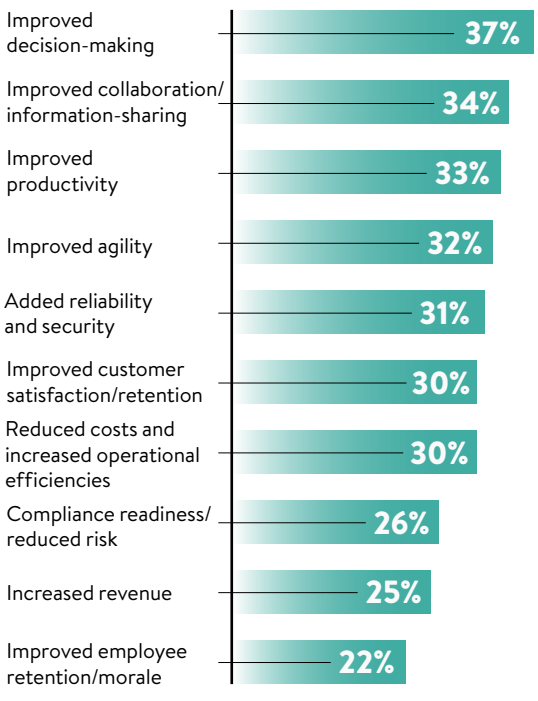
"People say technology is creating a fourth industrial revolution, but it's only recently that business has been really ready to exploit the tools at its disposal. And that exploitation is creating an exponential shift," says Ms Heneghan.


Appy Parking

Camden Council publishes data on publicly funded parking spaces, enabling companies such as Appy Parking to tell users where they can park

**TOP BENEFITS OF BIG DATA INITIATIVES**

SURVEY OF EUROPEAN AND AMERICAN EXECUTIVES INVOLVED IN BIG DATA INITIATIVES




Source: Capgemini 2016

The success of Uber and Airbnb suggests the biggest transformation comes when businesses embrace data and take an open approach to change. Yet an open attitude to the game-changing power of technology is not confined to Silicon Valley. Across all areas of business IT, executives are looking beyond the enterprise firewall, and connecting to external partners and customers.

Just as the public cloud has reached a tipping point in terms of business acceptance, so too more executives are willing to share knowledge in the hope of creating new opportunities. Take Omid Shiraji, interim chief information officer (CIO) at Camden Council, who is a big believer in openness. "Expose your data and you'll get more value than you'll ever imagine," he says.

Camden uses its open data platform to publish information on publicly funded parking spaces across the London borough. A startup called Appy Parking has built a business using that data. The app uses geo-location data to tell users when and where they can park.

"By releasing our data we've enabled a business to be created and have improved the lives of citizens," says Mr Shiraji. More developments could come soon. He says Camden is keen to explore the internet of things and is trialling parking bay sensors. "CIOs must look for ways to change customer experiences for the better – and you can create new value from exposing your data," says Mr Shiraji.

Not all business leaders, however, will find it as easy to take an open approach to data. Decisions about openness are often closely related to sectors and business models. Market-leading technology firms, such as Apple and Google, have maintained a market edge by keeping their intellectual property and details surrounding product releases a closely guarded secret.

mikecphoto / Shutterstock

> By releasing our data we've enabled a business to be created

Research from Russell Reynolds Associates suggests industries that are least disrupted often have perceived higher barriers to entry. In other sectors, a closed approach simply makes good business sense. Executives in heavily governed sectors, such as finance and law, are often unable to embrace openness. However, a sea change is taking place even here.

Chris White, CIO at global law firm Clyde & Co, recognises the crucial role of data in his business. The firm runs eight different case management systems, yet the proliferation of information means it can be difficult to create a single view of the customer across a number of lines of business.

Big data technology is helping Clyde & Co turn a manually intensive task into a competitive advantage. The firm is using analytics to create case reports automatically and encourages clients to come and see the results in real time. Mr White says an open approach to information can add value for customers.

> If you can mine the data you have, you create something really valuable

He envisages a situation where quantitative data bolsters qualitative opinion. Rather than simply relying on experiences, lawyers at the firm would be able to look at management information and present a factual answer on the chances of winning a case.

"If you can mine the data you have, you create something really valuable," says Mr White. "Being able to look back on hundreds of cases and tell a client their chance of winning is potentially huge. We can then start to advise, rather than just represent, our clients."

IT leaders at large firms, therefore, are keen to find ways to make use of information that might otherwise stay stuck in data silos. Rob Harding, European CIO at finance firm Capital One, says the key to success is using technology to shorten the time between data collection and the generation of insight.

"In Capital One, we used to talk about big data – now we talk about big and fast data," he says. "I can't get excited about huge data lakes; I can get excited about being able to generate interesting insight from the data we collect. Using information to improve our product set is for me the essence of big data."

Mr Harding points to QuickCheck, a service-based solution designed by the IT team that allows customers to test their suitability for credit. The firm continues to invest in new analytics tools. Many of the firm's 30 data science specialists are now focused on using Amazon Redshift to help fine-tune score modelling for the credit risk management of customers.

"There's no end-point to your work around big data," concludes Mr Harding. "CIOs must think about how quickly they can capture, analyse and generate insight, and then incorporate that knowledge back into something the customer actually finds valuable."

COMMERCIAL FEATURE

# HOW TO AVOID DEATH BY DIGITAL

*Why it's time to become a predictive enterprise*

It might sometimes feel like every day some artificial intelligence, big data-powered bot is eating your business one digital bite at a time.

Digital disruption has created change at an unprecedented rate in the retail and financial sectors. According to the *Deloitte Retail Volatility Index*, since 2009-10 the top 25 retailers, excluding Amazon, have lost 0.9 per cent of their combined concentrated market share, equating to $41 billion in retail sales in 2015. That's $41 billion of sales lost in the space of five years.

The same Deloitte research estimates that $200 billion more of retail sales is being taken from traditional retailers by digital-savvy firms such as Amazon. You only have to look at Walmart's recent acquisition of jet.com for further evidence of the industry redefinition taking place. Walmart is paying $3 billion in cash, plus $300 million in stock for key jet.com executives, for an online shopping business that has been live for a little over a year.

But it's not only retailers that are being eaten by digital. Many boardrooms in the banking and financial services industry are wondering if they still have a sustainable business model. The fintech disruption trend is completely upending a trillion-dollar industry and changing the fundamental premise of how people think about every aspect of their financial journey.

**PREDICTIVE ANALYTICS IN FINTECH**

Financial services firms who use predictive analytics achieved the following results

**10%** increase in new customer opportunities

**11%** increase in customers

**8%** cross-sell/ up-sell

Source: Aberdeen Group

Paul Johnston, group director, strategy and growth at The Qubix Group, provider of business intelligence and big data solutions to many of the world's largest organisations, says: "Many of these businesses are completely unprepared to react to the disruptive forces preying on them. Or frankly they are ill-equipped to find a way forward that doesn't end in their more digital-savvy competition winning."

So if you're a member of the executive team at a retailer or financial services business trying to survive, what can you do, what are the bold strokes besides buying in talent and platforms? How do you create your own unfair digital advantage?

"Banks and retailers have unprecedented volumes of data locked away in various silos," says Mr Johnston. "Finance has high-quality business-model insight; marketing holds weblogs and campaign analytics; IT will have rich data, such as point-of-sale feeds; and then there might be credit and loyalty card transactions, returns data, basket analysis, social media monitoring – the list goes on."

But he says: "Without adopting predictive analytics, the executive suite has a rear-mirror view of what has already happened. It's the wrong focus. Leaders today need to drive the business looking forward by getting answers to questions like what can we do to increase sales next week by 5 per cent and what's the probability of success? In the digital age, prediction will create their unfair advantage."

One of the bold strokes retailers can make, Mr Johnston suggests, is to organise their processes to optimise the insights they can gain from the flow of data through their business. "This requires executives to view the business not just in the traditional manner of stores, product categories or customer segments, but as rivers of data flowing that can be captured and turned into a powerful source of actionable insight as quickly as possible."

**INSIGHT-AS-A-SERVICE**

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- Faster time to insights
- Embedded best practices
- Outcome based
- Future proof

It's not easy. Mr Johnston believes that many businesses have the wrong analytics approach with results taking too long, costing too much and with teams who don't have the digital DNA required. "The need to create change and bring in a digital DNA was I'm sure part of the Walmart justification to spend a tidy $3 billion," he says.

Companies need to start operating as "predictive enterprises". Mr Johnston says: "Moving beyond just business intelligence, which can be a rear-view mirror of past performance, to mastering the field of predictive analytics will drive more profitable decisions and business forward in an entirely new way."

Predictive analytics uses many techniques, such as data-mining, machine-learning, modelling and artificial intelligence, to analyse current data to make more accurate predictions of future outcomes.

Becoming a predictive enterprise, by thinking fully digitally, is the only way to create a sustainable unfair advantage, says Mr Johnston. "With improved prediction comes a better return on investment, and an increase in the probability of additional sales, of more satisfied customers and of better-fit employees," he says.

However, it's not easy orchestrating data streams to build predictive capabilities. It's well documented that businesses across all industries are having great difficulty building a reliable, accessible, usable set of data for their teams to feed on.

But a successful enterprise will be based on more accurate prediction. Mr Johnston says: "Ultimately, the sustainability of a business will depend on how accurate its predictive capabilities become and how fast it moves to capitalise."

Another strategic challenge is that most vendors don't really want a shared risk-and-reward relationship with their clients. But companies such as The Qubix Group are changing the paradigm and offering an insights-as-a-service model that is directly tied to financial impact. This new breed of service provider has taken its cue from the software-as-a-service cloud-computing movement and pioneered a new way to deliver data-driven business value as a service faster than is possible with a traditional approach.

In this new model, the provider will design and host a smart compute platform. Businesses simply have to provide access to the raw enterprise data streams needed; the provider then cleans and enriches this with other public data, such as social media feeds, anonymised data, competitive data and comparative data, which the enterprise lacks. An army of data scientists takes over using strategies such as predictive and behavioural analytics to deliver actionable revelations that would otherwise not have been discovered.

> Ultimately, the sustainability of a business will depend on how accurate its predictive capabilities become and how fast it moves to capitalise

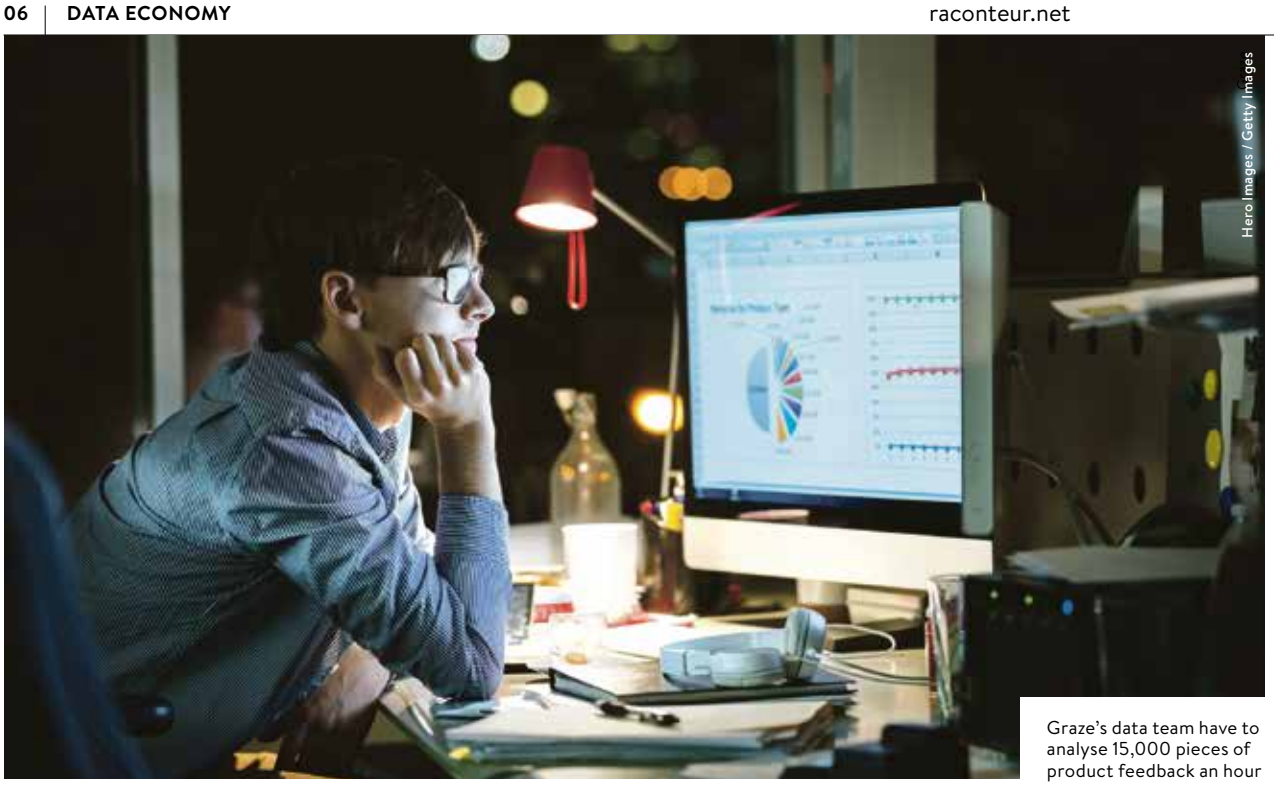
**RIGHT**
Paul Johnston
Group director of strategy and growth
The Qubix Group

Mr Johnston says: "While many businesses are data driven and have big data, this new as-a-service model means the provider can test the insight for value or scale insight-driven action across every part the business in a fraction of the time and cost."

Simply, analysis has little value if it doesn't provide meaningful insight. Insight has little value if it doesn't trigger action. And action has little value unless it's tied to desirable business outcomes. Insights-as-a-service reflects that logic and, as a result, its purpose is to enable and expedite top-line and bottom-line impacts.

"In the fight back to not be the latest upended business, leaders can now leverage a previously unavailable digital model where the cost of the target outcome is lower, the speed to results is faster and the value of the outcome is higher," Mr Johnston concludes. "By adopting a different analytics strategy, it is possible to create your own unfair digital advantage."

**For more information please visit www.qubix.com/predict**


Hero Images / Getty Images

Graze's data team have to analyse 15,000 pieces of product feedback an hour

# Make way for the data science experts

The growing importance of data analytics in business is leading to the appointment of senior data scientists to provide company-wide insights

DATA SCIENTISTS
HAZEL DAVIS

Big data analytics can transform how businesses operate. While marketing and sales businesses cottoned on to this early, more and more previously non-tech-focused companies are realising the benefit of having expertise on board.

"The way you can use data is a way not just to understand customers and products better, but also be organised in a way that makes decision-making faster and allows people to have more autonomy," says Anthony Fletcher, chief executive of snack company Graze.

Graze has its own dedicated data team, who "democratise data". Mr Fletcher says: "This involves finding sources of data, cleaning and feeding it into our central cloud-based data warehouse where anyone can access it anywhere, on a variety of devices.

"This tracks literally thousands of different data sources from how fast our factory lines are running, the strategies for posting boxes in the US, 15,000 pieces of product feedback we get an hour, social data, trends in sales, how people are using our mobile site, and so on."

The data scientists at Graze are also skilled at doing pieces of complex data analysis from attribution, A/B tests, machine-learning or various types of regression. "This often involves not only maths, but being really good at visualising data in ways which really tell the story," says Mr Fletcher.

Some companies position their data team in different ways. At Graze it reports to the chief executive. "This was highly unusual, but reflected the efforts of building the original infrastructure and creating the right culture around data," says Mr Fletcher. "The important thing today is they are a team who work across the business. This tends to be a draw for data scientists here as they get to solve so many different types of problems."

James Parsons, chief executive of digital workforce and consultancy Arrows Group, says: "Data scientists are the rocket scientists of the digital world and the role of the chief data scientist (CDS) is emerging as the influence of data spreads horizontally across business functions."

> A chief data scientist will be the enabler for next-generation innovations such as machine-learning algorithms, autonomous product development and accurate financial forecasting

A company's digital capability generally has three pillars, Mr Parsons explains, and the role of the CDS differs from the job of the chief information officer in relation to these three. "The IT infrastructures – platforms and tools – as well as the processes and methodologies – agile development practices – come under the jurisdiction of the chief information officer (CIO). The third pillar of digital capability is a company's data assets. Exploiting these assets into actionable insights is a function that is starting to outgrow the role of the CIO and this is where the CDS comes in," he says.

It is the role of the CDS to do the heavy lifting in managing the incoming flood of data. "They ensure that data is assimilated and analysed, then delivered as actionable insights to different stakeholders within the business. Designing and maintaining a standards-based data infrastructure is crucial if insights are to be made intelligible for departments such as sales, marketing and finance," says Mr Parsons.

So, where should data science be positioned within a company for success? "This all depends on the size and hierarchy of a business," he says. "For smaller enterprises, the data science function will often fall within the IT team's remit. But larger enterprises are beginning to create a distinct data science function. One company we work with is creating a horizontal data capability which spans their global operation. This moves away from the siloed ways of processing data – an essential step in achieving data-driven actions across all departments."

Data science is not a new role, but the creation of a chief data scientist represents the sharpening of executive capability for big data solutions. "The speed with which they are able to achieve innovation is of great importance and an increased capability to analyse the data streams flooding into a business is key to this," says Mr Parsons.

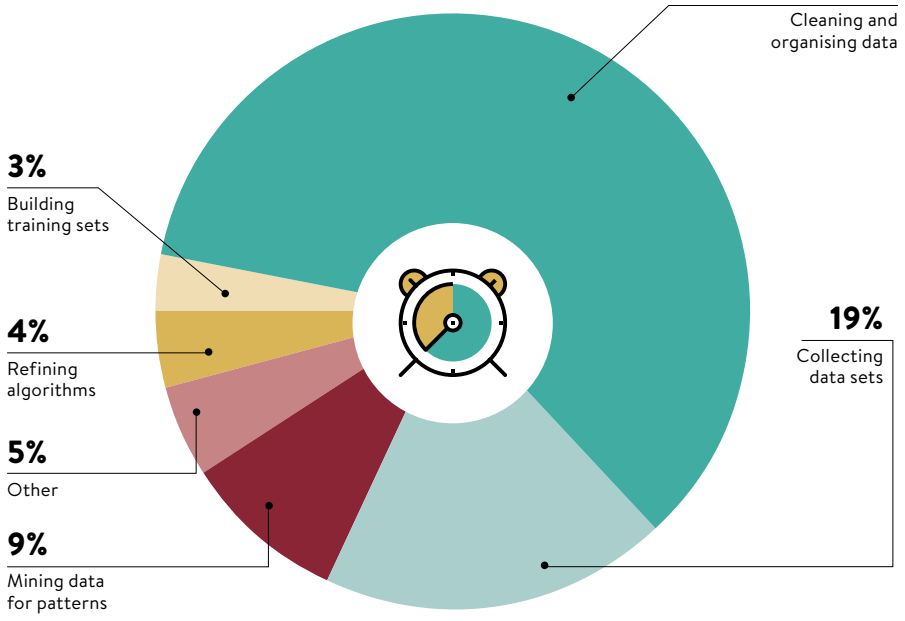
"A CDS will be the enabler for next-generation innovations such as machine-learning algorithms, autonomous product development and accurate financial forecasting as all these are powered by big data insights."

While companies of different sizes and at different stages of big data adoption may not always be ready for a CDS, the value of data to all businesses is growing exponentially. Bringing on board a new CDS may well be the best way to liberate insights from data for maximum business benefit.

"Having a CDS is of enormous benefit for companies that recognise data as a strategic asset to driving growth and profitability. It also sends a clear message that, as an enterprise, you take gaining value from data seriously," concludes Sachin Bagla, associate vice president at Infosys. "However, the role requires a board-level mandate and sponsorship to be successful."



**WHAT DATA SCIENTISTS SPEND THE MOST TIME DOING**




Source: CrowdFlower 2016

OPINION COLUMN

# Opening up to a fast-changing future

## Businesses that adopt an open approach to data and commercial collaboration stand to reap rich rewards

JENI TENNISON

Chief executive
Open Data Institute

Data underpins the products and services we use every day. It is one of the most valuable resources a business has and, like a road, its value is increased by the number of things to which it is connected.

The data powering these services is made available through a spectrum of access levels, from closed to shared to open. Open data is data anyone can access, use and share – it may not be apparent, but it underpins many apps we take for granted, such as Citymapper and Zoopla. Open data helps commuters pick travel options, parents choose schools, businesses select locations for their stores, and farmers work out which crop to plant and when.

We expect the government to open its data to enable us, the public, to hold it to account; to support more efficient public services; and to drive commercial innovation. But the case for businesses to open up their data is not usually driven by public good. While government provides infrastructure for society, this isn't the case for private-sector organisations that serve their customers and their shareholders. The thought of being open can run counter to the culture of some of our established businesses.

> Adopting an open approach towards data and business practices more widely offers commercial agility, pace and scale, and reduces costs

But there are big benefits. Adopting an open approach towards data and business practices more widely offers commercial agility, pace and scale, and reduces costs. By opening and reusing data, skills, systems and resources with collaborators, and embracing open solutions that arise outside the organisation, businesses can respond to new opportunities quicker than ever before. This can also be a catalyst for a wider change within an organisation's culture driving willingness to collaborate and find solutions within a larger network.

These are known as porous organisations. Last year the Open Data Institute (ODI) published research into how large businesses make use of open data, from agricultural research to urban planning and design. It found that data, along with new technologies and ideas, is made more valuable if it is openly exchanged between organisations.

For example, Thomson Reuters has developed a product called PermID. It started as a solution to an internal data management challenge to connect data assets from around the organisation. But now the identifiers for that data are published under an open licence, any business can build their systems on Thomson Reuters' data, with less cost and less risk.

So, can businesses actually make money from adopting open approaches? The answer, backed up by an array of evidence, is yes. Built on open data published by Transport for London, the Citymapper app helps users navigate a growing number of international cities. It may be competing with more established players, but a funding round this year valued the company at around £250 million.

Research from Lateral Economics showed that open data from the public sector creates 0.5 per cent more GDP compared with paid data. And last year a report by PwC revealed that the Open Data Challenge Series – a partnership between the ODI and Nesta – could see a ten-fold return on investment to the UK economy. Indeed the ODI recently revealed that alongside its network of startups, franchises and partners, it has unlocked £50 million of value to the economy since it opened in December 2012. Proof if proof were needed that forward-looking businesses can reap rewards through being open.

# It's boom time for sales algorithms

Forecasting sales with predictive analytics is a valuable business asset, but must be used with care and in-depth understanding

**PREDICTIVE ANALYTICS**
CHARLES ORTON-JONES

So where's the recession then? Before the Brexit vote, 71 per cent of economists polled by Bloomberg said a vote to leave the EU would trigger negative growth for the first time since 2009. Leave campaigner Michael Gove was ridiculed for suggesting "we'd heard enough from experts". And yet here we are, growing as normal.

It's more than a one-off incident. Economists are simply terrible at making predictions. A huge study by Prakash Loungani of the International Monetary Fund revealed the record of economists was barely better than guess work. "The record of failure to predict recessions is virtually unblemished," he mocks.

The psychologist Philip Tetlock looked at political forecasts throughout the 1980s and 1990s. He found a consistent pattern of wrong predictions, associated with huge world-changing events. The CIA famously failed to predict the fall of the Berlin Wall. Professor Tetlock later wrote a book, *Superforecasting: The Art and Science of Prediction*, about making predictions and repeated his view that "the average expert was roughly as accurate as a dart throwing chimpanzee".

This is bad news. Businesses need accurate forecasts. A supermarket must estimate how many cabbages it will sell, or risk overstock or selling out. Airlines must be able to judge passenger no-shows, in order to maximise revenue. It's a basic task of business.

The mission, therefore, is to know when forecasts are reliable and when not. This involves digging into the mechanics of forecasting, and identifying the glitches and vulnerabilities. And there are some horrors in there.

One man who's paid to help companies identify their wrongdoing is Giles Pavey, chief data scientist at dunnhumby, the retail analytics company famous for inventing the Tesco Clubcard. He can rattle off umpteen forecasting errors.

"Most modelling techniques rely on different factors being independent to each other," says Mr Pavey. "That is the biggest mistake you can make. If you think of putting a tax on sugar, you may assume that by raising the price by 10 per cent sales will fall 10 per cent. But that is not the only relationship. You may find retailers decide not to promote sugary drinks or that families decide not to give their children sugary drinks. Things either spiral up or down. Very few models include this."

Often the data is wrong, missing or misinterpreted. Danielle Pinnington, managing director at shopper research agency Shoppercentric, says new product launches are a great way to watch this error in action. "Big data can't tell you what it hasn't already measured. It can't predict the outcome of a wholly new idea because it doesn't have relevant data on which to base the prediction," she says, recommending bespoke research to address this.

Ms Pinnington offers another shortcoming: "This behavioural nature of much big data also means that it can't tell you why shoppers are behaving in that way. For example, in the retail sector it won't provide the details of the context to purchase decisions, the mindset of the shopper or their attitudes and expectations on a given purchase occasion." The slump in VW car sales, which came immediately after the scandal of emissions fixing, is a good example.

> It is critical to always sense-check the data input and acknowledge whether data accuracy or sample size is good enough before relying on algorithms

Looking for answers in pricing, reliability data and promotions would be entirely misleading. As Ms Pinnington notes: "This leads us to the real Achilles' heel of big data, the fact that it captures behaviour among shoppers and not those who didn't buy or who don't use your product or brand." And they are just the people you need to complete the picture

Sometimes the tiniest glitch can cause havoc. Arne Strauss, associate professor of operational research, explains: "The number of sales may not correctly represent demand for the product. For example, if the product ran out of stock in the middle of the week, the resulting weekly sales figure does not represent the demand for that product that could have materialised if it would have been available all week."

OK, those are the challenges, but what are the solutions? In fact, there are some great ways to bring order from chaos.

A key message is to limit the scope of your forecasts. French rail network SNCF uses software from Qlik to optimise staffing. In a niche area such as this, forecasts can be made with high accuracy. "By viewing the peaks on age groups in certain areas, it is possible to anticipate necessary training and recruitment," says Hervé Genty, a project manager at the railway.

Increasing data inputs will help. For example, the weather can affect sales patterns. So why not include Met Office data? It may come as a surprise that the Met Office is delighted to help corporate partners. It currently aids United Utilities to look at the relationship between weather and water demand.

Suck in all the data you can. Builders merchants Travis Perkins adopted a package from analytics company SAS to track 100,000 SKUs (stock keeping units) across its 21 distinct businesses. It then worked with a big data specialist CoreCompete to forecast the best stock levels at each location. Crunching numbers like these is hard, but doable.

If necessary, use artificial intelligence (AI). A new courier app called Stuart is hoping to offer rapid delivery services for retailers in urban centres. To forecast demand it is using AI. David Saenz, UK managing director of Stuart, says: "We use historical data from all our current clients to understand patterns in terms of time of day, transport modes requested and areas in the city, which we use to accurately forecast the potential demand coming in and the associated number of couriers required. On top of this, we also need to factor in new clients coming on the platform or any expected variations."

He warns that relying on AI 100 per cent would be foolish. "Relying too much on data without sense-checking and taking feedback from operational experience can be toxic. In this context, it is also critical to always sense-check the data input and acknowledge whether data accuracy or sample size is good enough before relying on algorithms," Mr Saenz says.

Even the best AI is limited. He adds: "Exact timing and breadth of sudden peaks or other black swan events are extremely difficult, if not impossible, to predict."

A gold standard is to change forecasting from broad numbers, to judgments derived by looking at individual components. Eric Fergusson, director of retail services at commerce specialist eCommera, says: "A number of retailers, particularly those with direct mail heritage, have a relatively sophisticated budgeting process which forecasts revenue based upon prior customers repurchasing.

"This is based on historic metrics of repeat purchase and response rate to campaigns. It is, however, an aggregate forecast, rather than specifically being used to state that 'Eric Fergusson of the Barbican', for example, is 90 per cent likely to shop in the third week of June.

"Interestingly, not as many retailers pursue this data-led forecasting methodology as you would think, with many still preferring to roll forward historic growth rates, which neglect the underlying performance of the customer base, and can lead to 'surprise' gaps as recruitment slows during maturity."

Predictive analytics is a booming trade. Bluewolf's 2016 *The State of Salesforce Report* found that 81 per cent of Salesforce's software customers globally said increasing the use of predictive analytics was the most important initiative for their sales strategies.

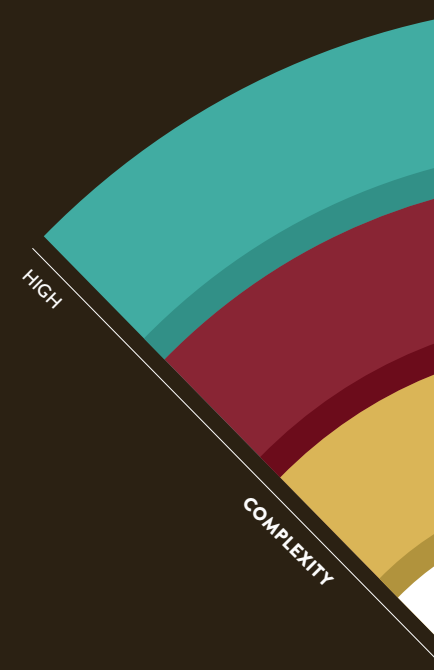
But it's vital to understand the limitations of this art, as well as the solutions. We can cope with errors by economists, but poor forecasting in business can be a lot more serious.



## POWER O

**BUSINESS INTELLIGENCE TECHNO**
EACH DISCIPLINE BUILDS ON THE ONE BELO

◆ Technologies used

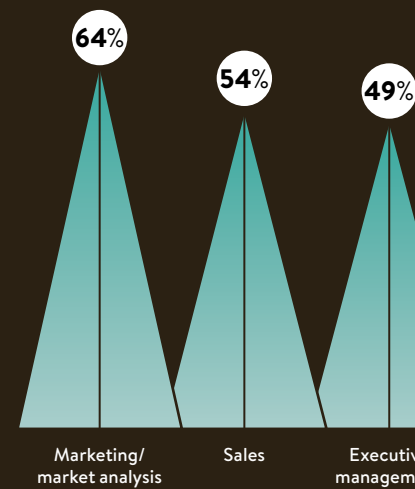



**SIX STEPS OF PREDICTIVE ANALYT**

01 **UNDERSTAND DATA**
Identify data that is relevant

02 **PREPA**
Integra the dat analyti

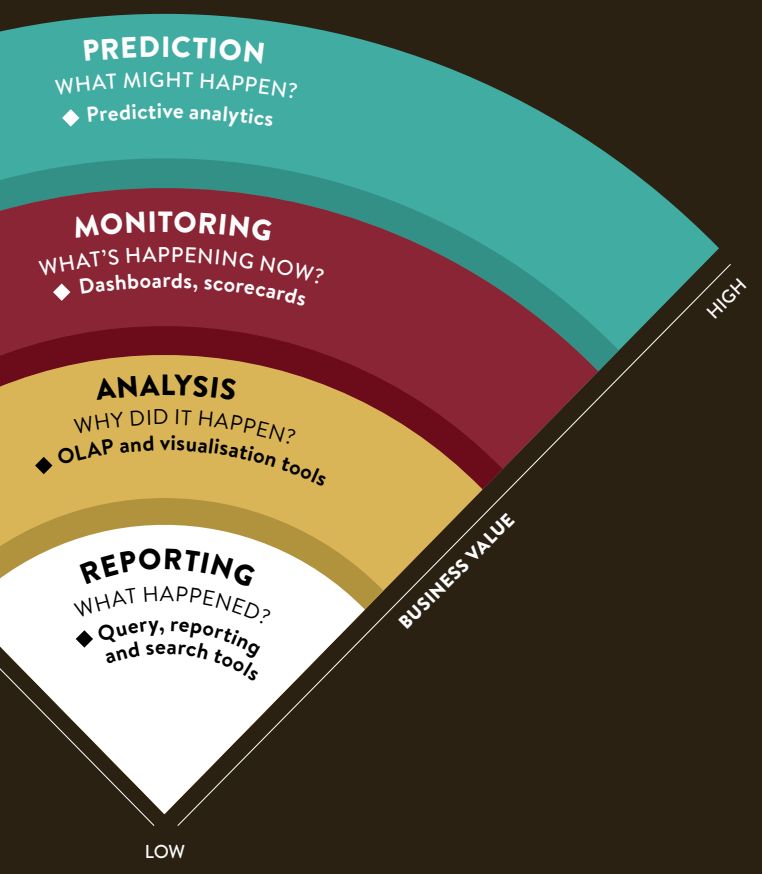
**SECTORS WHERE PREDICTIVE ANA**
GLOBAL SURVEY OF C-SUITE EXECUTIVES



# OF PREDICTIVE ANALYTICS

## LOGIES

OW IT – THESE ARE ADDITIVE, NOT EXCLUSIVE, IN PRACTICE




Source: SAS 2016

## TOP 10 DRIVERS FOR PREDICTIVE ANALYTICS

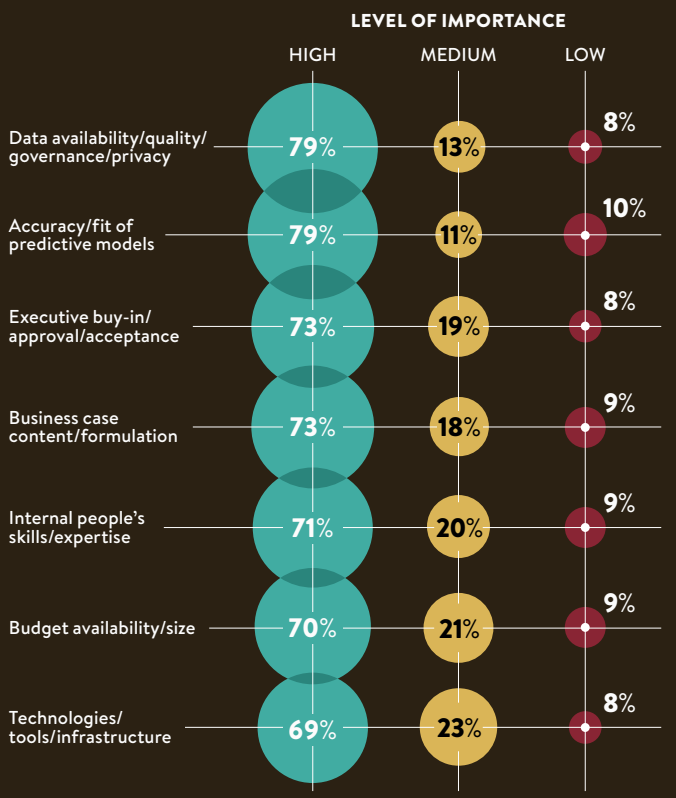
SURVEY OF BUSINESS AND IT EXECUTIVES

01 PREDICT TRENDS
02 UNDERSTAND CUSTOMERS
03 IMPROVE BUSINESS PERFORMANCE
04 DRIVE STRATEGIC DECISION-MAKING
05 PREDICT BEHAVIOUR
06 DRIVER OPERATIONAL EFFICIENCY
07 PROVIDE TARGETED PRODUCTS/SERVICES
08 IDENTIFY NEW BUSINESS OPPORTUNITIES
09 IMPROVE PRODUCTIVITY
10 IDENTIFY RISKS

Source: TDWI Research 2014

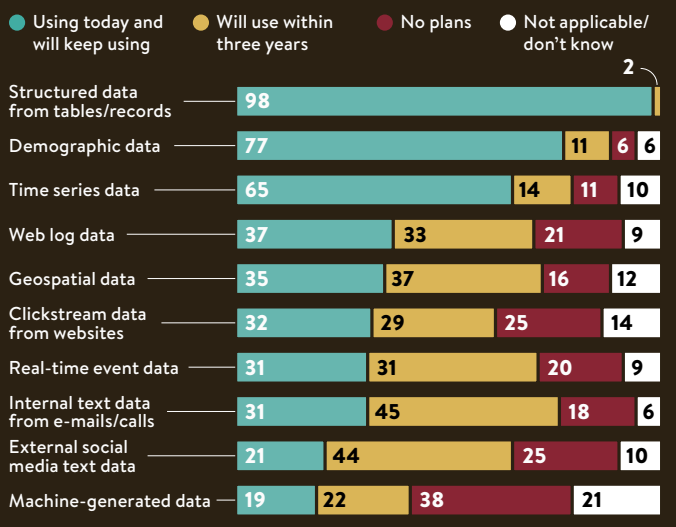
## TOP FACTORS ENABLING PREDICTIVE ANALYTICS

GLOBAL SURVEY OF C-SUITE EXECUTIVES



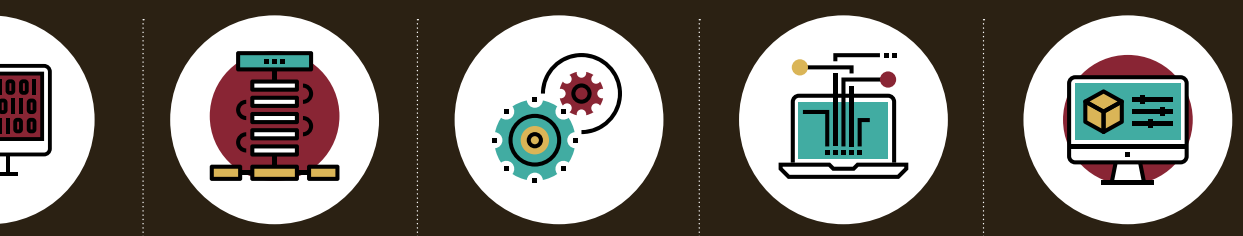

## DATA USED FOR PREDICTIVE ANALYTICS (%)

GLOBAL SURVEY OF C-SUITE EXECUTIVES



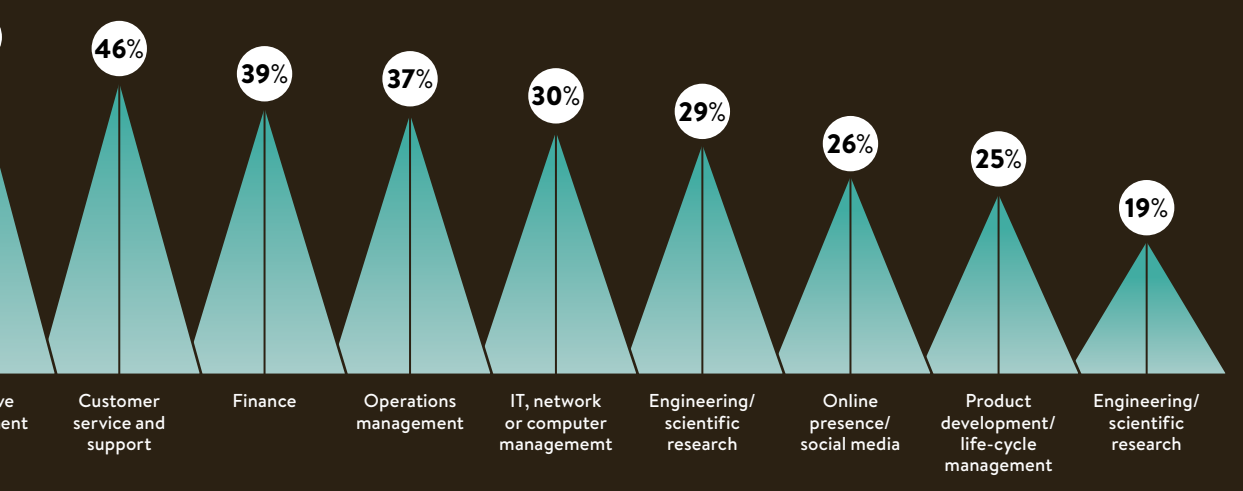

Source: TDWI Research 2014

## ICS




Based on a graphic in the July 2016 Forrester report, *Predictive Analytics Can Liberate I&O Pros From The Tyranny Of Firefighting*

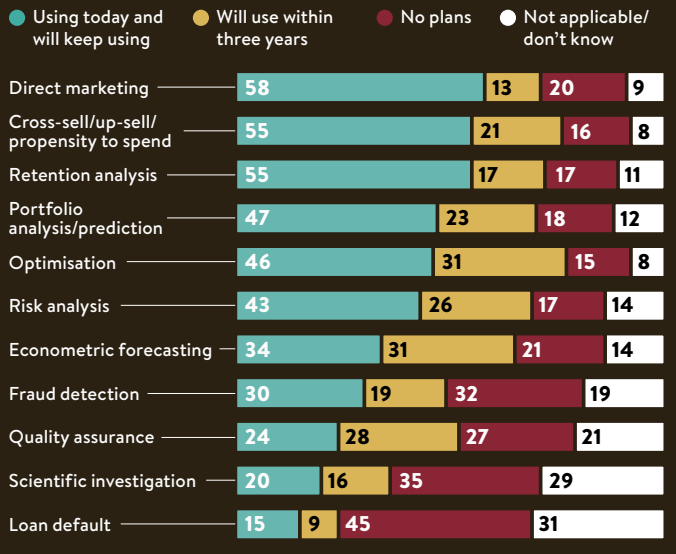
## ALYSIS IS USED




Source: TDWI Research 2014

## WHERE PREDICTIVE ANALYTICS ARE BEING USED (%)

GLOBAL SURVEY OF C-SUITE EXECUTIVES




Source: TDWI Research 2014

# Power and persuasion of algorithms

They are clever and influence our behaviour – now algorithms are getting smarter and more powerful

ALGORITHMS

MARK FRARY

What we see, what we buy and what we think are increasingly out of our control, and are instead being chosen by computer algorithms.

Algorithms, mathematical number crunchers that decide on the order in which web pages, products and status updates are presented to us online, have become evermore sophisticated over time.

When Google first launched its now-ubiquitous search engine, the results one person saw were essentially the same as any other. Now, the results each person sees are based on hundreds of different signals that have been weighted by Google's PageRank algorithm and are increasingly tailored to each individual user.

This strategy has seen Google grow into a $75-billion behemoth, with the money largely coming from its ability to pair adverts with what people are searching for, driven by that self-same algorithm.

Other companies have also recognised the potential of algorithms to boost the bottom line. The products you see recommended on Amazon are the result of what is called an item-to-item collaborative filtering algorithm, essentially showing you what other customers bought together in the belief that you will like them too. It is believed that some 35 per cent of Amazon's revenues are driven by this recommendation algorithm.

> Algorithms will become smarter and stop thinking about what I am doing and focus on what I am inferring

As a result of the success of Google, Amazon and others, hundreds of retailers now use search algorithms to personalise their results. They use Amazon's A9 algorithm expertise as well as technology from other search technology providers, such as SLI Systems, which powers hundreds of e-commerce sites, guiding website visitors around sites and making personalised recommendations.

If you visit a site powered by search technology such as SLI's, it typically works like this: on your first visit when they know nothing about you, it will show products based on popularity among other users. Once you have started searching using keywords, it will show the most popular for those. If it knows you have purchased something from the site, or indeed elsewhere on the web before, it will use that information to finesse the results.

With an algorithm deciding what you see, should we be worried that we are being made to buy those items that earn a retailer the most profit rather than what we really want?

SLI's chief technology officer Shaun Ryan says we need not worry. "It is better giving the shopper the product they want, rather than the one with the highest margin, and then get their return business?" he asks.

There is also the argument that increasing personalisation reduces the chances of serendipitous discovery – finding something you love that you were not originally looking for.

"If you go to Boden and type in the search box, we show popular search terms that match the characters you type to improve user experience. You will see the one you looked for, but also other, serendipitous ones," he says.


01 Shutterstock

**01**
Google's PageRank algorithm means its search results are increasingly tailored to each individual user

**02**
Amazon uses an item-to-item collaborative filtering algorithm to recommend products to customers; the algorithm is thought to drive 35 per cent of its revenue

Elizabetta Camilleri, founder of online fashion and beauty recommendation service Shopological, says algorithms need to get better at throwing wildcards into the mix.

"Even though I may never have shopped at Chanel or Primark online, I might still be interested in seeing their products," she says.

This means that algorithms need to learn from lots of different sources about your behaviour and start making predictions that go beyond the obvious.

"Algorithms will become smarter and stop thinking about what I am doing and focus on what I am inferring," she says. "The fashion industry is bad at this; they use algorithms to try to sell me what I have already bought. If I buy a dress, I should be recommended shoes, scarves and coats not the same dress."

SLI's Mr Ryan argues that people have shown they are willing to share more of their personal information in order to get better recommendations.

"The most prudent retailers are sensitive to privacy," he says, "but if they can position it that if you allow them to use your data to give your better recommendations, most people will say yes. The creepy thing that people find is retargeting, when you look at a product and then it follows you round the internet."

Websites getting better at knowing what we want is one thing, but what about the more worrying contention that algorithms are changing what we read?

In 2015, a study published in *Science* magazine showed that Facebook's algorithm, which is based on many factors, reduces your exposure to things that you disagree with. The study, which involved more than ten million users in the United States who had declared their political affiliation, found that the Facebook algorithm filtered out one in twenty of cross-cutting hard news stories in the newsfeeds of conservatives and one in thirteen of those who identified as liberals.

It sounds like a small effect, but what if algorithms can change our actions in events with consequences larger than just a fashion statement.

Robert Epstein of the American Institute for Behavioural Research and Technology has looked into Google's algorithm and what he calls the search-engine manipulation effect.

"People are likely to believe whatever Google – using its secret algorithm – chooses to rank higher in its search results," he says.

Dr Epstein and colleagues carried out five double-blind, randomised controlled experiments, using more than 4,500 undecided voters in the US and India. In the experiments, Dr Epstein changed the order of the results presented by Google to see whether they influenced voter intention.

He showed that biased search rankings could shift the voting preferences of undecided voters by 20 per cent or more.

If algorithms can help elect Donald Trump, perhaps we should all be worried about their growing influence.


02 Northfoto / Shutterstock

**TOP GOOGLE SEARCHES IN 2015**

TOP FIVE MOST GOOGLED WORDS IN THE UK, BY CATEGORY

| | Films | How to... | Destinations | People | Politicians | What is... | Where is... |
|---|---|---|---|---|---|---|---|
| 01 | *Jurassic World* | lose tummy fat | New York | Cilla Black | Jeremy Corbyn | a Penny Black stamp? | Mali? |
| 02 | *50 Shades of Grey* | get rid of brain freeze | United States | Lady Colin Campbell | Charles Kennedy | an exit poll? | *Broadchurch* filmed? |
| 03 | *Fast and Furious 7* | lose weight quickly | Australia | Jeremy Clarkson | David Cameron | leavers lace? | San Marino? |
| 04 | *Spectre* | use the new Snapchat update | Spain | Lamar Odom | Ed Miliband | 0 divided by 0? | Namibia? |
| 05 | *American Sniper* | register to vote | Cornwall | Anne Kirkbride | Chuka Umunna | a solar eclipse? | Nepal? |

Source: Google 2016

COMMERCIAL FEATURE

# ALGORITHMS FOR THE MASSES

*Facebook, Google and Amazon use algorithms to optimise their services – now a British pioneer is bringing algorithms to companies of all sizes*

SATALIA

Daniel Hulme is the founder and chief executive of a young British company specialising in optimisation algorithms and services. It's akin to a maths think-tank. Satalia's staff of academics and artificial intelligence or AI experts harness a library of algorithms to help companies solve the world's most difficult problems. It was recognised this year on the elite Gartner *Cool Vendors in Data Science* list, the only UK company chosen.

It helped a major UK telco embark on a big upgrade programme. Copper lines would be replaced with fibre. With thousands of miles of trunking to consider, the telco needed to calculate the best possible routes. Even tiny improvements to plan the fibre routes would mean huge cash savings. The problem? The number of possible routes to consider quickly spirals out of control. There are trillions upon trillions of conceivable sequences. It's insanely hard to compute.

In fact, the problem will be familiar to anyone with an engineering background. It's a twist on the travelling salesman problem taught to every computer science and advanced maths student.

Satalia ran the telco challenge through its algorithms library they call the Solve Engine, which uses machine-learning to select the best algorithms to solve optimisation problems. The Solve Engine found a solution 1,000 times faster and 20 per cent better than the existing approach.

The example is far from a one-off. Satalia is at the forefront of bringing algorithms to the masses. It has a growing portfolio of success stories. In each case Satalia uses algorithms to solve an optimisation problem too complex for the client to handle.

"We can tackle any type of optimisation problem, which usually involves some combination of planning, scheduling and routing," says Satalia founder Daniel Hulme. "We have a library of thousands of algorithms and deep expertise in optimisation, which means we can help clients with almost any complex task. We deal with a wide variety of requests, including workforce scheduling, planning mobile phone masts, identifying bugs in software and creating the best vehicle delivery routes."

Even small problems can be blitzed by the Satalia team. A university asked Satalia to create a timetable to fit student preferences and lecturer availability. The process created the most efficient timetable possible, while cutting the task time by 60 per cent.

Dr Hulme is evangelical about the potential for companies of all sizes to embrace algorithms to solve everyday problems. Back in 2007 he developed the idea of optimisation-as-a-service while doing his doctoral thesis in AI at University College London. He has since become a global figurehead of the algorithm revolution, speaking at TEDx talks and industry events on how algorithms can be harnessed.

His mission is to bring algorithms to the masses and help business leaders realise how critical optimisation is to the success of their company. "We've all heard of big data and advanced analytics," he says. "The basic level is descriptive analytics, which is just the visualisation of data. Lots of firms do that. Then there's predictive analytics, which is about making forecasts. A small number do that.

"We are offering prescriptive analytics. This is a new field in which algorithms recommend specific actions. With prescriptive analytics you now know what to do with the insights extracted from data."

One of Satalia's biggest successes is the optimisation of delivery routes for a leading international retailer. The client understood the potential cost-savings of using algorithms to compute the best journeys for delivery vehicles.

Dr Hulme says: "Suppose you have to deliver packages around in a city. If you have 24 packages to deliver there would be 24x23x22x21 and so on (620,448,401,733,239,439, 360,000) possible routes. Even if a supercomputer could calculate a million routes every second it would still take 20 billion years – longer than the age of the universe – to determine the best one. Add another delivery and it's 25x20 billion years (500 billion years). This is why algorithms are so important in the rapidly growing complex world of business."

**ABOVE**
Dr Daniel Hulme, chief executive: "I love talking about what is, and what is not, artificial intelligence"

> We can tackle any type of optimisation problem, which usually involves some combination of planning, scheduling and routing

So can any company approach Satalia with a problem to solve? "Absolutely," says Dr Hulme. "We'll take a look at anything and we're motivated to solve the biggest problems. For large corporates, we build integrated end-to-end AI solutions; for small companies, we take away the need to have expensive data-science and optimisation teams."

Satalia has clients from the United States to Japan, in multiple sectors. "We'll soon be launching a public version of the Solve Engine," Dr Hulme reveals. "Customers will buy solve time by the hour and every time they submit a problem, it will use up some time, similar to mobile phone pay-as-you-go credits." The pricing model is flexible. Jobs can also be priced per problem, through an enterprise-level contract or with a permanent on-site presence. A freemium model is also available.

Awareness of algorithms is soaring. A lot of companies look at examples, such as Amazon's product recommendation service or an airline's dynamic pricing engine, and wonder whether it is plausible to create something similar in their own enterprise. Satalia makes it possible.

"Too many companies are either not using algorithms or using vanilla in-house versions that really aren't fit for purpose," says Dr Hulme. "Our Solve Engine and expert services means they can completely future-proof their optimisation."

> For large corporates, we build integrated end-to-end AI solutions; for small companies, we take away the need to have expensive data-science and optimisation teams

Satalia's algorithm library is regularly updated by the academic community, using the latest innovations in optimisation. This allows companies to make the best decisions from data and focus on their core business.

Dr Hulme is regularly invited to events and conferences to speak about the role of artificial intelligence in tomorrow's world. "As a company we don't do cold calling," he says. "We raise awareness about the huge impact of optimisation and algorithms, and how to solve incredibly hard problems. When companies realise what we can do for them, we become partners."

**To find out more visit Satalia.com or e-mail Daniel Hulme at daniel@satalia.com**

## Five reasons to talk to Satalia

- We utilise thousands of the best decision-making algorithms fresh from academia
- We have deep expertise in data science, optimisation and artificial intelligence
- We understand the future is data, insights, optimisation and adaptation
- We are an agile team of developers, modellers, mathematicians and philosophers
- We're driven to solve the hardest problems and build solutions that users love

# Intelligent machines are learning

Teaching a computer to learn from big data is the foundation of artificial intelligence which is poised to revolutionise business and the workplace

MACHINE-LEARNING

NICK EASEN

There isn't a day that goes by that you don't come into contact with artificial intelligence or AI. You watch, listen or buy this on Amazon, Netflix or Spotify, so why not try that? Apple's Siri recognises our speech, while financial institutions use robo-advisers.

"We use AI so much that we have stopped thinking of it as AI," says Nello Cristianini, professor of artificial intelligence at the University of Bristol. "We need to step back and realise that a lot of today's data revolution is also about artificial intelligence," and appreciate that it's already embedded in the world around us.

The bedrock of AI is machine-learning, a process that teaches computers to tackle vast amounts of data, pull out patterns, apply complex algorithms and make decisions about real-life problems, such as healthcare issues or money markets. And lately there's been renewed interest in AI after it suffered a downturn some decades ago.

"The pace at which AI is developing is accelerating," says Nitin Bhas, head of research at Juniper Research. "The building blocks for rapid learning are now in widespread use." The technology is also more mature and providers are starting to deliver above and beyond the hype.

If data from the United States is anything to go by, AI is exhibiting a funding bubble, according to CB Insights. In 2015, 397 ventures were financed to the tune of $2.3 billion, up from 196 companies and $757 million in 2013. As of June this year, 200 deals were done amounting to $1.5 billion and 2016 looks set to be a bumper year.

The UK has also seen activity, albeit snapping up AI startups, with the purchase of DeepMind by Google for $500 million and Swiftkey, a smart keyboard firm bought by Microsoft for $250 million. Money, expertise and economic clout now pepper this sector.

"AI has the potential to affect us in a similar way to the arrival of the printing press. We will see jobs change just as we did during the Industrial Revolution," says Rob McInerney, co-founder of IntelligentX Brewing Company.

This London company is using AI to brew beer. It learns from experience in much the same way a human brewer learns to concoct a pint by listening to experienced experts and learning from its mistakes.

"We call it ABI – automated brewing intelligence – and it has the ability to churn out recipes. This is then given feedback from both expert human brewers and our customers. This feedback allows ABI to evolve the beer and discover new recipes," says Dr McInerney.

This same style of machine-learning can predict the likelihood of us contracting disease by processing X-rays, MRI scans and other data more accurately than the human eye. AI can also help accelerate diagnoses and recommend therapies. It is now eyeing up drug discoveries and other bioscience applications.

"A life science paper is published every 30 seconds; PubMed publishes 10,000 new updates a day. Humans alone cannot process all this

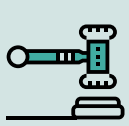
## SECTORS TO WATCH


**RETAIL**
Artificial intelligence (AI) is used at front of house to drive new customer experiences and engage shoppers.

**HEALTHCARE**
The benefits of using AI to share expertise are enormous in terms of patient efficiencies and outcomes.

**FINANCE**
It is not only highly engaged in trading, but also in fraud detection and risk management.


**ADVERTISING**
It is used to target and optimise media buying, and achieve greater efficiencies for brand development and customer acquisition.



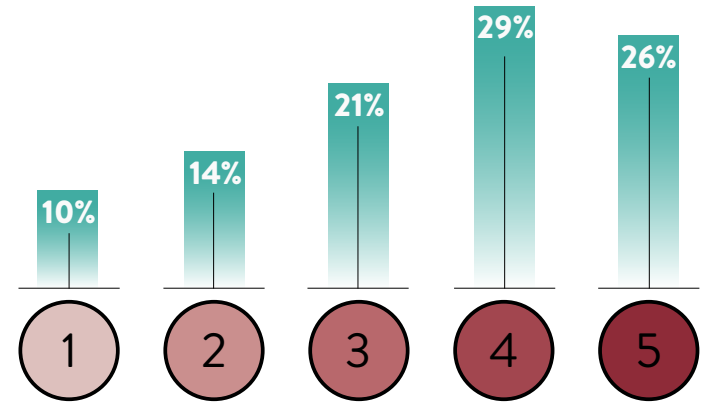
**LAW**
Tech companies produce contracts in a fraction of the time they used to at lower costs, offering more efficient service and greater personalisation.

> Machine-learning is a process that teaches computers to tackle vast amounts of data, pull out patterns, apply complex algorithms and make decisions about real-life problems


Brewing company IntelligentX are using artificial intelligence to create the world's first "self-improving" beer

**IMPORTANCE OF MACHINE-LEARNING FOR DATA SCIENCE**

DATA SCIENTISTS WERE ASKED TO RANK IMPORTANCE ON A SCALE OF ONE TO FIVE, FIVE BEING MOST IMPORTANT




Source: CrowdFlower 2016

information to advance scientific research," says Jackie Hunter, chief executive of benevolent Bio.

"We have developed a system that uses cutting-edge deep-learning techniques to analyse large quantities of very complex scientific information, and we've created an enormous structured, curated and qualified data lake of usable knowledge which can be applied by scientists for use in the real world."

Finance has also been an early adopter. AI is now driving new types of uncorrelated returns for investors, reducing exposure for insurers, and helping banks make better and safer loans. "It is a thousand times cheaper than it was and it is now a thousand times more powerful. Growth has been exponential," says Huy Nguyen Trieu, chief executive of The Disruptive Group. "The main challenge is not on the tech side, it is about implementing it."

There is still a lack of clean, scalable and labelled data to work on. Also corporations aren't allocating resources fast enough. It's the reason why it's not been used extensively in say retail banking. "Machine-learning specialists and data scientists are a scant human resource these days," says Jonathan Epstein, chief marketing officer of Sentient Technologies.

However, barriers to AI use have dropped significantly. It is now easy to get large amounts of computation firepower via the cloud and data requirements are declining, as algorithms become more efficient and are easier to train. This will make it more accessible for other uses.

"All companies will be AI companies in the future," says Chris Williams, IBM Watson chief architect for Europe. "Each industry will have its version of the killer app based on its own unique requirements and the problems that need solving."

The main issue is to do with manpower. Recruiting and training top-notch staff to work on AI will be crucial. "As with all rapid technological innovation sectors, the biggest challenge is finding the right people to support us," explains Ms Hunter.

As new careers in this industry flourish, expect repetitive and predictable jobs in other sectors to be axed by AI, including those in the knowledge economy. "People with more common jobs will be more at risk. It's more likely to be economical for a company to invest the resources required to automate that task," says Miles Brundage, AI policy research fellow at the University of Oxford. "Those with more unique jobs are likely to be safer."

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COMMERCIAL FEATURE

# POWER OF A DATA-DRIVEN CUSTOMER EXPERIENCE...

*Success hinges upon businesses placing their customers at the heart of what they do – and data plays a powerful role*

In today's increasingly competitive market, businesses that don't adopt a customer-centric approach are setting themselves up for failure.

"The explosion of the digital era, combined with growing consumer demand for a more personalised experience, has resulted in a shift in power," says data expert Edwina Dunn, co-founder of dunnhumby and chief executive of Consumer Insights firm Starcount. "Harnessing customer data has become a valuable commodity for businesses wishing to succeed."

Ms Dunn, whose revolutionary approach helped build a portfolio of success stories, has long been at the forefront of customer data; dunnhumby was responsible for Tesco's groundbreaking Clubcard, the first mass-customisation marketing programme in the world, at a time when firms discarded data following a transaction.

> Leveraging data can have a powerful impact on the customer experience

She says: "Businesses that want to set themselves apart from their competitors need to understand exactly who their customer is. Leveraging data can have a powerful impact on the customer experience. Data tells a story and the story of the customer is one that every business should feel compelled to explore."

Customer data is an undeniable must-have for businesses looking to improve their offering, but critical to their success is understanding how to use that data to deliver a better customer experience.

Ms Dunn believes many businesses pay lip service to the concept of customer experience, but in reality remain product-centric. "Too often the priority is driving efficiencies and as such brands are built upon products rather than the customer," she says. "Chief marketing officers are rarely included on the board, so there is no customer voice in the boardroom."

She passionately believes that in order for businesses to achieve success, the corporate spotlight should be on their customers.

"Experience has shown that utilising customer insight can help transform a business from a secondary player to a significant market leader. The key is channelling the findings into the marketing strategy in the right way," says Ms Dunn. Insight is powerful, but only when turned into action by creating relevant responses to customer needs.

A growing abundance of data, in part thanks to social media, means the challenge for many businesses is how to demonstrate they've listened to customer needs. Looking at transactional data will only offer a rear-mirror view. To gain a real understanding of their customer, businesses need to analyse third-party data for example, social media which can show future intent.

"Technology is undeniably vital in providing businesses with a knowledge bank, but it's just the enabler; businesses need to adapt their overall marketing strategy to make timely and relevant offers," Ms Dunn explains. "They must be proactive, embedding customer behaviour, their personality, aspirations and evolving needs." Only then can business offer the right product at the right time – the essence of perfect marketing.



Edwina Dunn, Investec ambassador

Ms Dunn believes the process is two way. Customers are often happy to share data if it results in a more relevant offer, for example a better tariff or extra incentive. By using customer and third-party data, businesses can create truly personalised campaigns and inspire repeat purchase and customer loyalty. Single-minded focus on transaction data will only tell you what customers have bought, it won't tell you what they want next.

"Quite simply," she says, "businesses that fail to capitalise on the power of internal and external data will fail to succeed."

**Edwina Dunn is an ambassador for the Investec Private Banking Restless Spirits Campaign. Read more about her passion to #ChallengeOrdinary at investec.co.uk/edwinaonthestand**

COMMERCIAL FEATURE

# FLEXIBILITY AT A TIME OF CHANGE

*Enterprise cloud solutions could be the answer to your IT infrastructure problems in an uncertain and fast-moving digital world*

NUTANIX
Your Enterprise Cloud Platform


Organisations of all types and sizes are facing unprecedented levels of economic and technological uncertainty, and one of the biggest challenges for enterprises and public-sector bodies today relates to how they can prepare for the changes they will inevitably face.

For Stockport Council in north-west England, finding a future-proof IT infrastructure service that is powerful and flexible enough to deal with the unforeseeable demands of the coming years is a vital component in the organisation's current digital transformation programme, Digital by Design.

"Local public services are experiencing significant change and it's hard to know what services requirements will be over the next five years," says Stockport Council's IT operations manager Adrian Davies. "We need a highly flexible cloud solution that will evolve as the requirements of the council change. It needs to support potential expansion, collaboration with partners and the demands of new ways of working, all without disruption to services," he says.

Following a competitive tender process, Stockport has chosen to partner with enterprise cloud leader Nutanix. The Nutanix solution will replace the council's ageing legacy SAN architecture, which has become slow, inflexible and expensive to operate and maintain, and consolidate computing, virtualisation and storage into a single, highly scalable appliance.

Mr Davies adds: "Enterprise cloud solutions appeal as they break down so many barriers and offer the level of flexibility required during complex change – it's a big step and a very exciting one."

> We need a highly flexible cloud solution that will evolve as requirements change

Working with Nutanix means the council can scale up its virtual server environment much more quickly, easily and cheaply, while the time taken to recover and back up data has also been slashed.

The efficiency, reliability and flexibility that Stockport Council is benefiting from are also translating into a significant competitive advantage for Nutanix's private-sector clients. For online trading and spread-betting firm London Capital Group (LCG), installing Nutanix's on-premises Enterprise Cloud Platform means the company's IT infrastructure is more efficient, easier to run and more resilient than its predecessor. This has resulted in faster and more reliable deal execution times, which is of huge value to LCG and its customers.

"Our first Nutanix demo was a real light-bulb moment, alerting us to the availability of an equally scalable alternative that could be both quicker to deploy and simpler to manage," says Blair Wright, chief information officer at LCG. "The reduction in the complexity of installation and diverse skillset requirement we would have had with other vendors has been a major factor in keeping to our deadlines. We've managed with far less headcount than we thought and haven't had to hire any specialist storage staff."

Paul Phillips, Nutanix's senior regional director, says his company's solutions complement the public cloud services offered by the likes of Amazon Web Services. "We liken the public cloud to going on holiday and renting a room in a hotel," Mr Philips explains. "All the services you need are provided, but you know you're paying a premium.

"On the other hand, if you move to a country permanently, you're not going to stay in a hotel for the entire period. You might eventually want to buy your own apartment, so it makes sense from a cost perspective and you can customise everything to your own taste and practical requirements – the same as with the private cloud."

Paul Phillips, senior regional director , Nutanix

This customisation, Mr Phillips adds, could apply to security levels, for example. "We have a lot of public-sector customers and, for them, data like health records need maximum security," he says. "Whereas more mundane, day-to-day data that has less sensitivity can be set with a different level of security which allows wider and quicker access for efficiency."

The pace of technological and economic change means that, more than ever, enterprises need to innovate to survive. Installing a cloud-based IT infrastructure that is cheaper, more efficient and more reliable than the alternatives frees up time for them to do exactly that.

**For more information please visit www.nutanix.com**

# Keeping track of

The information they collect is personal, so and protect against the misuse of data

WEARABLE TECHNOLOGY
HAZEL DAVIS

As consumers we gladly gobble up devices that track our personal information, whether it's running time, pulse, how healthy we are, sleeping patterns or what excites us. Many of us do it without a moment's thought, entrusting our private data to numerous software applications, device manufacturers and the internet.

"This data collection is necessary in order for the devices to be able to perform the functions they were designed for," says Garry Partington, chief executive of RealityMine and chairman of mobile app developer Apadmi.

"Wearables require data to gain insight into how people are engaging with the technology and how the user experience can be enhanced. Fitbit, for example, collects data on the user's health levels, and uses it to improve its algorithms and provide better personalised fitness programmes."

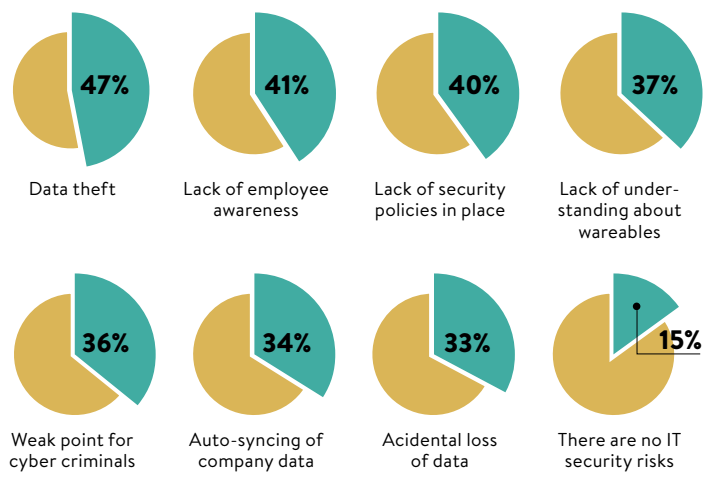
However, Sian John, Europe, Middle East and Africa chief strategist at cyber-security firm Symantec, warns: "As the internet of things takes off, companies are building gadgets that connect to the internet without considering the potential security threats."

A bracelet might talk to your phone, which talks to your computer to record your movements, which then sends this data to a third-party computer that analyses your behaviour and gives you lifestyle recommendations. Each point of contact represents an opportunity to exploit any vulnerability and the data is only as secure as the weakest link in the chain.

These systems are not only vulnerable to an attack, they also lack notification methods for consumers and businesses when vulnerabilities are discovered. Ms John says: "Even worse, they don't have a friendly end-user method to patch these new vulnerabilities. Given this, we are going to see new threats in ways in which we've never seen before."

Wearable tech providers are thus balancing the demand for constant innovation and battery efficiency with device security. Serge Huber, chief technology officer and co-founder of digital customer man-

## IT SECURITY RISKS WEARABLES PRESENT FOR ENTERPRISE SECURITY

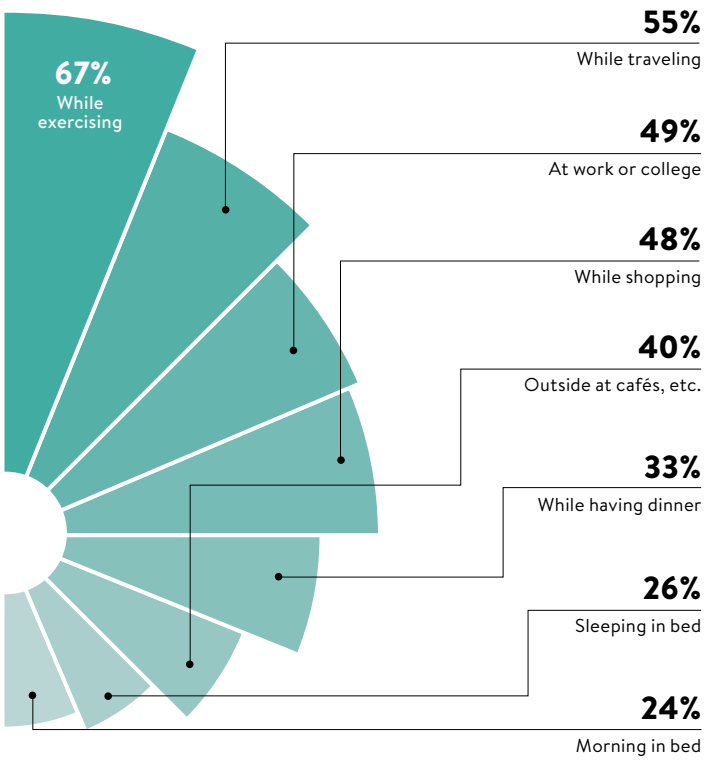



Source: Trend Mirco 2015

# data from wearables

## companies developing wearable technology must ensure privacy


**OCCASIONS WHEN WEARABLE DEVICES ARE WORN EACH DAY**




Source: Ericsson 2016

agement platform Jahia, says: "The wearable market is booming, but there is a pervasive concern in that consumers are not fully aware they are being tracked from a data standpoint via their device. Even more, third-party apps may be accessing their information and, all too often, the organisation which contracted the third-party apps does not know what is happening with that data."

The particular sensitivities which surround wearable tech arise from the fact that much of the data being collected is of a very sensitive nature, for example health and location data.

Mike Llewellyn, associate at international law firm Olswang, identifies two concerns: "Firstly, where categories of data are being collected which are not strictly necessary to perform the functionalities of the wearable, and secondly, where companies use data that's required for performing the functionalities of the wearable for other means, including their own commercial purposes, as well as making this data available to third parties."

From a legal perspective, Mr Llewellyn says: "It's important to ensure the consumer is aware of the categories of data that are being collected, how it's being used and the extent to which these are necessary." This, he says, empowers the consumer to make informed decisions about their data.

But there are guidelines. Wearable devices must comply with UK data protection laws, such as the Data Protection Act. This means that only relevant data should be collected, and this information should then be stored securely and deleted when no longer required. Companies developing wearables must also be transparent with users about what type of personal detail will be gathered and how it will be used.

> Competing interests need to be balanced, which can be hard when collection and monetisation of data is a crucial aspect of the business model that supports the wearable tech industry

"The ICO [Information Commissioner's Office] labels 'personal' data as anything that can be used to identify an individual, and companies that hold such details face fines of up to £500,000 from the ICO and criminal prosecution if this information is breached or lost," says Mr Partington. "To avoid facing these serious consequences, companies must ensure they are collecting and processing data in line with the legislation, and have processes in place to keep their customer's information safe."

Kolvin Stone, a partner in the technology companies group at international law firm Orrick, warns: "While consumers do have strong rights, these are not absolute and wearable tech companies may use data for their legitimate interests. These often competing interests need to be balanced, which can be hard when collection and monetisation of data is a crucial aspect of the business model that supports the wearable tech industry."

Mr Huber says it simply comes down to honesty. "Organisations need to be transparent with consumers about what information they have about them, how they plan to use the data and also give the consumer the choice of opting out of any data collection or even better give them some sort of control over it," he says.

"Gaining their trust in these data exchanges will actually become a competitive advantage and major differentiator as we enter the new phase of more personalised experiences. The best experiences are based on trust, transparency and professionalism, so it is no longer acceptable to sacrifice the privacy of consumers, hoping they won't notice it."

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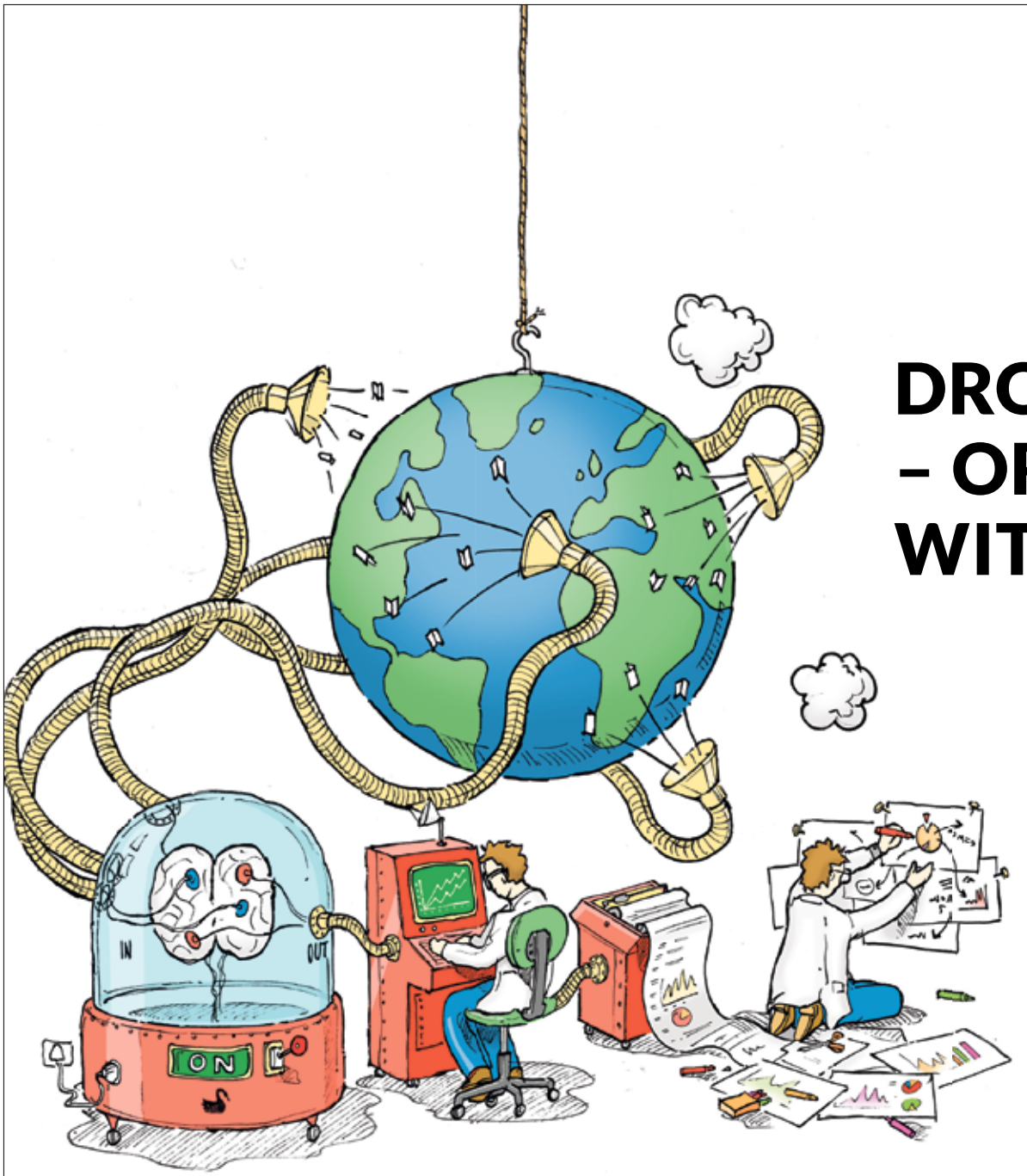


# DROWNING IN DATA – OR SWIMMING WITH IT?

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