



Big Data and AI 2019
A Blue Door Point of View

O₂
business



Big data. It's not how much
you have, but how you use it

Why O₂ thinks artificial intelligence matters to you

Are you getting value from your data?

The size of the digital universe is doubling every two years. And with our increasingly digital habits, and more Internet of Things (IoT) and machine-to-machine (m2m) devices coming online every day, by 2020 we'll have seen a 50-fold growth in the amount of data generated, compared to 2010¹. We're seeing this drive many organisations to take a new approach to data.

But is your data delivering on all the possibilities? How can you capture, manage and analyse your data in a way that will make you more efficient, create stronger customer relationships and help you to grow more quickly?

One part of the answer is artificial intelligence (AI): the ability to rapidly process, analyse and interpret data. AI technologies have been around for years and are already widely used, for example to review a loan application for risk, or target marketing based on likes and dislikes. But now AI is coming of age.

In 2018, the government announced significant new funding for AI research, so the UK can reap the benefits of AI between now and 2030, estimated at £232bn².

But the other part of the solution is surprisingly non-digital: people. People who understand how your organisation works and know the right questions to ask of your data. People who can turn the answers into actionable plans while also

considering the ethical and human impacts. And manage data compliance, privacy and security.

£300m
The UK government's investment in AI research in 2018

Given the challenges, at O₂ we're looking at how both we and our customers can harness the benefits of big data, and how the increasing use of AI and machine learning will open new doors. Here's our view, and how we're managing it ourselves, along with insight from leading industry analyst Ovum.

"We probably should stop calling it big data. All of today's data is big. And tomorrow's will be even bigger. The interesting conversation is about its value."

Tom Pringle
Head of applications research
Ovum

¹ The exponential growth of data, <https://insidebigdata.com/2017/02/16/the-exponential-growth-of-data/>

² Tech sector backs British AI industry with multi million pound investment, www.gov.uk/government/news/tech-sector-backs-british-ai-industry-with-multi-million-pound-investment--2

An effective organisation is built on the insight data provides

The idea of using data to drive a business isn't new. If you're using the reach of a past advertising campaign to make decisions about your next above-the-line placement, or you look into customer spending patterns so you can improve your stock levels, then you're making data-driven strategic decisions.

What has changed is the breadth and depth of data available, the rate at which it's increasing, and the tools available to analyse it. HR teams can now analyse an organisation's intranet site or Workplace by Facebook for positive and negative word usage to gauge the happiness and engagement levels of their employees. Recruiters can profile CVs for the relevant skillsets at the press of a button.

Combining multiple data sources can deliver even greater benefits. We worked with Sussex Police and Surrey Police to equip officers with handheld devices, preloaded with apps that securely combined data from over 35 different systems across both forces. There has been an immediate and positive impact on productivity: easier collaboration, fewer errors and less travel back to the station has cut nearly two hours of admin per shift per officer.

Strong data management is linked to strong financial performance, and a company with a well-defined data strategy is more likely to financially outperform its competitors. These organisations are also more likely to be effective in applying data and analytics to real business problems.

But as data volumes grow, so does the demand for data analysis, and it can be hard to prioritise projects.



54% of executives believe that an inability to leverage data is a threat to their organisation³



97%

of businesses are investing
in big data and AI projects



76%

of businesses say that the
increasing availability of data
is empowering AI initiatives



72%

believe AI is the technology
with the most disruptive impact





Is AI the answer to your data dilemma?

We think so. We are seeing many businesses and public sector organisations reassessing how they can extract more tangible business value from data.

Tom Pringle, head of applications research at Ovum, says, "The challenge for many organisations is that they started to collect and store data without a clear understanding of how they wanted to use that information, or what critical business outcomes it could deliver. Which is where AI and particularly machine learning come into their own."

Technologist Jerry Kaplan describes machine learning as "a computer program that learns to extract patterns from data from a seemingly infinite variety of forms – video taken from a moving car, reports of A&E visits,

surface temperatures in the Arctic, Facebook likes, phone calls and transcripts – just about anything that can be captured, quantified or represented in digital form⁴."

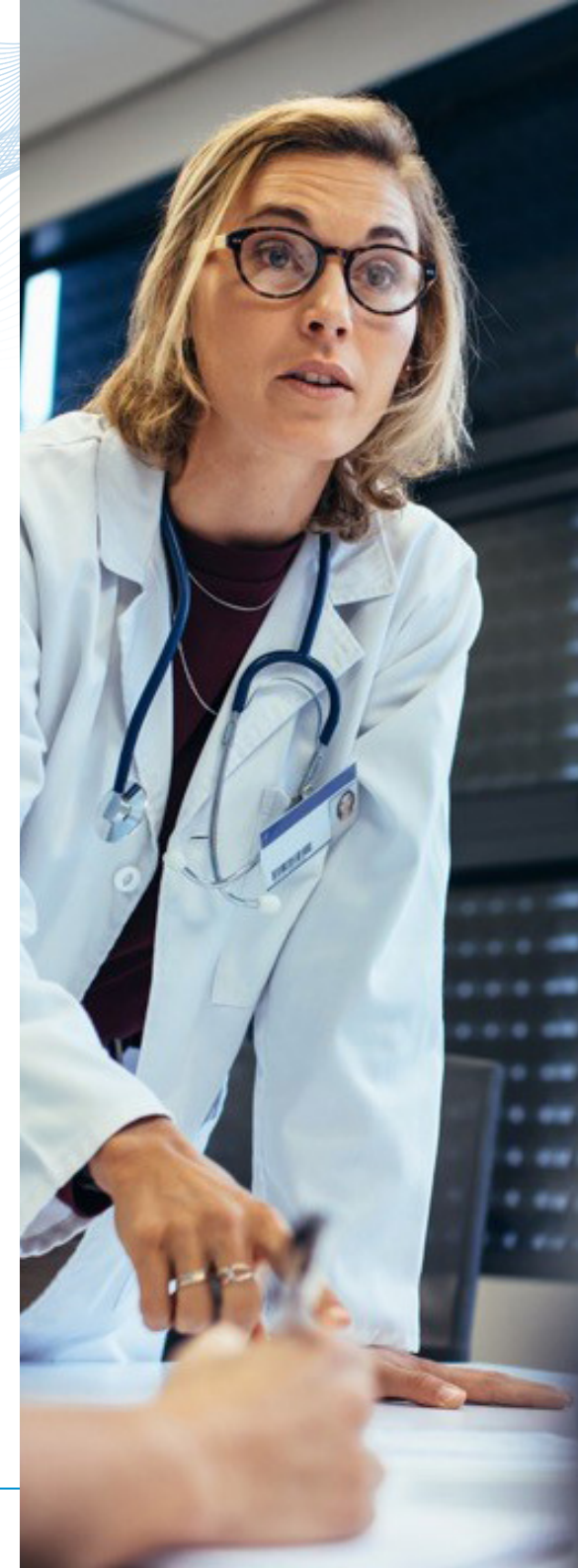
As such, machine learning delivers significantly more value than rules-based programming, and faster. And the bigger the datasets, the better your insights and more accurate your predictions too.

It's difficult to think of an industry that hasn't been touched by AI, but even so, there are some surprising examples. In China, which has one of the world's highest lung cancer rates, radiologists in a Shanghai hospital are using AI to improve medical diagnosis. The AI technology learns the core characteristics of lung cancer by analysing historical records of healthy

patients and patients at different stages of the disease. It then reads CT scans of new patients and prioritises suspect lesions and nodules for radiologists to focus on.

It's estimated that AI support for medical imaging diagnosis could improve outcomes globally by 30-40% by 2021, and reduce the cost of treatment by as much as 50%⁵.

Process-driven businesses like financial lending use AI too. With identity fraud up 125% compared to 10 years ago⁶, AI can flag anomalous loan applications when it spots them, freeing up loan experts to concentrate on the cases that raise concerns. It's reducing business risk, significantly speeding up loan approval times and providing a better customer experience.



⁴ Jerry Kaplan, *Artificial Intelligence: What everyone needs to know*, 2016, <http://jerrykaplan.com/books/>

⁵ Frost & Sullivan, *From \$600 M to \$6 Billion, Artificial Intelligence Systems Poised for Dramatic Market Expansion in Healthcare* 2016, www.frost.com/news/press-releases/600-m-6-billion-artificial-intelligence-systems-poised-dramatic-market-expansion-healthcare

⁶ New report reveals record levels of identity fraud in 2017, www.cifas.org.uk/newsroom/new-report-reveals-record-levels-identity-fraud-2017



What AI means to O₂

From managing network usage to the offers we provide through our customer loyalty scheme, it's clear that AI helps us to make good business decisions and provide better customer experience.

We use anonymised data from 2 million customers a day to enable our Self-Optimised Network (SON) to automatically redirect mobile coverage to meet the needs of our customers in real time, providing a better customer experience. And it's AI that makes sure we are providing our customers the right offers in our loyalty programme, Priority.

As we move toward the launch of our 5G network, we'll see a step change in the number of devices coming online. It will allow for even more interpretation of more localised information across an even wider network, as we connect more IoT and m2m devices than ever before.



Won't AI destroy the world as we know it?

"AI is really automation. It's been going on in various forms from farming to manufacture, and it all boils down to taking away the manual and repetitive work."

Tom Pringle
Head of applications research
Ovum

Whether you look to famous people or friends, you'll find views at each end of the spectrum. In 2014, Stephen Hawking warned that AI may replace humans altogether. And before his death, he reiterated that creators of AI systems need to 'employ best practice and effective management' to ensure it doesn't become the 'worst event in the history of our civilisation' – an emphasis on the consideration of the ethics of AI's continued development⁷.

Jerry Kaplan suggests a more realistic viewpoint, saying, "Will AI computers suddenly come alive? More likely, the tasks we deem to require human ingenuity are simply more susceptible to automation than we care to realise⁸."

In many cases, AI will manage simple or repetitive tasks. And the benefits are clear – a reduction in manual or labour-intensive jobs which frees people to work on higher value tasks.

Eddie Short, director of data, insight and analytics, O₂ says, "AI has, and will, remove some jobs. But only in the same way the word processor took away the typing pool, and the tractor removed the need for horses. AI will allow the creation of new roles, and move people away from the mundane, or 'boring' work. Evolution isn't necessarily scary."

The use of AI technology does need to be carefully managed. Data integrity is critical – as is the depth and diversity of data used to develop assumptions. In short, poor quality data will give you inaccurate results. And because you're analysing faster, mistakes will snowball

quickly, potentially corrupting further assumptions and the insights that rely on them.

Tay, the shortlived AI chatbot, is a perfect example of this. Designed to learn from its interactions with Twitter users, Tay quickly 'learnt' sexist and racist language and spiralled out of control. Less than 24 hours later Tay was gone⁹. It was a great lesson in the responsibility needed in AI development – and the importance of the human presence.

Dave Sweeney, managing director, O₂ Insights and Big Data, says, "It's safe to say the human element will always be required at some stage of the process. You need people to define the wider organisational needs, and use AI to provide a way to have better insight for those people to make the right decisions."

⁷ Stephen Hawking says A.I. could be 'worst event in the history of our civilisation', www.cnn.com/2017/11/06/stephen-hawking-ai-could-be-worst-event-in-civilization.html

⁸ New Vantage, Big Data Executive Survey, January 2018, <http://newvantage.com/wp-content/uploads/2018/01/Big-Data-Executive-Survey-2018-Findings.pdf>

⁹ Microsoft's neo-Nazi sexbot was a great lesson for makers of AI assistants, www.technologyreview.com/s/610634/microsofts-neo-nazi-sexbot-was-a-great-lesson-for-makers-of-ai-assistants/



The importance of ethics

The question of ethics within AI extends across how data is managed, stored and used. In 2018, it was discovered that large amounts of personal social media data had been accessed by third parties without the knowledge or consent of the people involved. When that data was shown to have been used to provide targeted political advertising, it ignited discussions about the ethics of data misuse and manipulation.

While this might seem a long way from the issues your organisation has to face, the ethics of data management is important, and regulations are likely to evolve further.

At the same time, people are reconsidering the value of their personal information. Where previously someone wouldn't think twice before exchanging their email address for free internet access, or accepting a cookie in order to access a web page, more people are now aware that this data could be handing over unseen insights into spending habits, browsing habits, family life and lifestyle.

Compliance requirements, such as the EU's GDPR, are part of an answer to maintaining public confidence. Organisations also need to look inwards at their data management practices, even if the questions have uncomfortable answers.

68%
of people don't trust brands to handle their personal information appropriately¹⁰

Tom from Ovum suggests that one way to approach the ethics of what you're doing is to consider how your customers would feel if they found out about it.

He asks: "Would your customers be happy about what you're doing? Or, if your organisation was featured in the news because of a particular way people's data was reported to be used, would your CEO be happy with that?"





Ethics in practice

"If a customer feels they can trust a company with their data then they will have a stronger relationship."

Tom Pringle
Head of applications research
Ovum

At O₂, these considerations are already at the heart of what we do, including solutions like Smart Steps and O₂ Wifi Insights, which use data from our networks to provide movement and usage insights. It was our ethical view on the use of this information,

and our core values of bold, open and trusted, that led to us developing both services to levels more stringent than required by European data protection laws.

Dave Sweeney from O₂ explains: "The data in our insight solutions comes from anonymised and aggregated network data – it can't be used to identify individuals. It means mobile users can use our services without compromise, yet also helps organisations to improve their customer service using highly valuable insights into customer trends and habits. It's already helping engineering and planning firms to deliver better infrastructure projects, and retailers to plan future store locations."



But it's all about the people, too

For the moment, data is data, and AI is only a technology – you'll only get valuable insights when the right people, with the right skills and knowledge are involved in developing the process to use that data. And data and AI experts are in high demand – data analysts are in the top five most difficult roles to recruit for¹¹. Most importantly you'll need people who can understand your organisation and know what specific questions need to be answered that will deliver true value.

Bringing together existing business experts and data experts to work together is the easiest way for an organisation to quickly become more insight-driven, and ensure the value of accessible data can be maximised.

Eddie Short from O₂ says: "If blue is data knowledge and red is business experience, you actually need a purple person. But they're very hard to find. So do we take business experts and train them in data? Or data experts and train them in business? At O₂, we bring a person from each role to work and drive insights together."

48%
say people challenges
are the greatest
barrier to becoming
data-driven¹²

Whether they're business or data experts, once you've got good people, it's important to keep them. For example, in addition to a competitive package, we work hard to give our teams interesting projects, and feedback into how their involvement is adding value or benefitting our business. IT experts are often unsung heroes, and we make sure the critical nature of what they enable our organisation to do is recognised.

This approach aligns with Tom's view. "It's no longer just IT people who are responsible for managing data and analytics – it's moving into the lines of business. And business people are less interested in managing technology, they're interested in hitting the business outcomes," he says.

"With some caveats, it doesn't matter who holds the data as long as it's in a place and format that can be used effectively. And that's important because sometimes your data only provides effective insight if it is combined with other data sources."

Eddie Short
Director of insight,
data and analytics, O₂

¹¹ Data scientist jobs: Where does the big data talent gap lie? www.itpro.co.uk/careers/28929/data-scientist-jobs-where-does-the-big-data-talent-gap-lie-1

¹² New Vantage, Big Data Executive Survey, January 2018, <http://newvantage.com/wp-content/uploads/2018/01/Big-Data-Executive-Survey-2018-Findings.pdf>



Your own people, or other people?

Another way to manage data is to look for partners who align with your goals. Rather than gathering and storing more data, and managing teams of analysts, a third party does it for you. Or gives you a simpler way of analysing the data yourself, as with O₂ and Smart Steps.

It might be a case of connecting a number of different data sources, like bringing together research agency insight with your own data to create a 360-degree view of your customer.

Your data outlines their core details, while the agency provides insight into local market trends and activities. This way of working can also reduce your workload, as you're moving some of the compliance requirements outside of your organisation. You also leverage domain-specific talent and experience to complement your in-house teams.

But what matters most is your ability to use data effectively for your organisation's needs. Whether your data analysts are internal or external, business or IT experts, you'll need to make sure you find the right balance. And that, together, they're putting your organisation's goals at the heart of their work.





Big data in practice

Jacobs® works on infrastructure projects across the UK and had traditionally relied on paper-based, roadside surveys to help plan the impact of its clients' projects. Moving to Smart Steps data has helped to improve the value of its analysis by increasing survey sample sizes, while simultaneously reducing project costs and slashing the planning time required.

Smart Steps gives Jacobs access to more than 3 billion mobile network activities each day from across the UK, as well as historical data that provides an insight into movement trends over time. Smart Steps data also captures movement data of commuters on

buses, bikes and trains (determined by the speed and number/location of stops) rather than just the vehicles researchers had previously been able to stop and question at a survey point.

The tangible value of Jacobs' data could be measured in terms of the reduction in project costs. But multibillion-pound engineering projects rely on the data analysis underpinning them, so even more important was the richness of the data and the insight it provided.

JACOBS®



Where will AI take data analytics in the future?

We see the adoption and growth of data analytics being powered by three converging trends:

- exponential growth of both structured and unstructured data
- cheaper and more accessible data storage and processing power
- improvements in machine learning to include complex data sets.

"AI can't exist without big data, and big data is almost meaningless without AI."

Eddie Short
Director of insight,
data and analytics, O₂

And we're already seeing this first hand at O₂. The activity levels on our mobile network increased with the arrival of 4G, and as we continue to expand our mobile, wifi and fixed network footprints, we expect to see an even bigger jump in our network usage.

5G will also bring another huge leap in data volumes, as more low-powered sensors and beacons connect to our networks. Smart cities, homes and offices, the Internet of Things, connected infrastructure, Industry 4.0, and more – organisations in every sector will see an exponential increase in the data they need to manage, keep secure and analyse.

"Ask a senior member of any organisation or business about their goals and they'll tell you that it's to become an insight-driven organisation. They may not actually say it using those words – they might say they want to become more efficient. Or to grow faster. Or to deliver more relevant and personalised services to customers. But it's only through a better approach to data that all of these outcomes are achieved," explains Tom from Ovum.

And this is where it becomes clear that big data and AI are inextricably linked to deliver those outcomes.





Are you heading in the right direction?

Is an outdated approach to data reducing your organisation's ability to perform at its best? Today's competitive advantage is firmly based in strategic data insight, and you may need a new way to manage your data if you want to enhance the services you deliver to your customers, communities or people.

Consider these key questions:

How effective is your use of data?

Are you collecting the right information at the right time, and linking it to clear business objectives?

Is your HR team giving you the right talent?

Are you finding the right people from inside and outside your organisation?
Can you keep the talent you recruit?

Do your people have the insights they need?

Can all your business decisions be backed up by comprehensive data insight?

Talk to us about how we can help with data and analytics.

From access to Smart Steps data, and cyber security and IoT solutions exploiting award winning connectivity. We're here to start supporting your business strategies today.

Wherever you are on this journey, O₂ can help you achieve better results.
To find out more, visit o2.co.uk/business or get in touch on **0800 955 5590**.