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NATIONAL AI STRATEGY

Superpowered steeplechase: a scramble for AI supremacy

Westminster's new AI strategy is a step in the right direction, but there are hurdles – particularly concerning regulation, data-sharing and skills – that could hinder the UK's progress

Oliver Pickup

In the global AI investment, innovation and implementation stakes, the UK lies in a creditable third place. Trailing the US and second-placed China, it holds a slight lead over Canada and South Korea, according to the *Global AI Index* published in December 2020 by Tortoise Media.

The moral of Aesop's most famous fable involving a tortoise may be 'more haste, less speed', but Westminster is seeking to hare ahead in this race over the coming decade. Its national AI strategy, published in September 2021, is a 10-year plan to make the country an "AI superpower". But what does that mean exactly?

Although Westminster has already poured more than £2.3bn into AI initiatives since 2014, the new strategy will accelerate progress, promises Chris Philp, minister for technology and the digital economy at the Department for Digital, Culture, Media and Sport.

"It's a hugely significant vision to help the UK strengthen its position as a global science superpower and seize the potential of modern technology to improve people's lives and solve global challenges such as climate change," he declares.

The Croydon South MP explains that the strategy has three main objectives. These are to ensure that the country invests in the long-term development of AI; that the

technology benefits every sector of the economy and all parts of the country; and that its advancement is governed in a way that protects the public and preserves the UK's fundamental values while also encouraging investment and innovation.

"We have heard repeatedly from people working in and around AI that these issues are entirely connected," says Philp, hinting at the complexity of the task at hand.

What will life be like for people living and working in an AI superpower? "There are huge opportunities for the government to capitalise on this technology to improve lives," he says. "We can deliver more for less and give a better experience as we do so. For people working in the public sector, it could mean a reduction in the hours they spend on basic tasks, which will give them more time to find innovative ways of improving public services."

Philp continues: "For businesses, we want to ensure that there are clear rules, applied ethical principles and a pro-innovation regulatory environment that can aid the creation of tech powerhouses across the country."

AI will also be crucial in helping the UK to meet its legal obligations to achieve net-zero carbon emissions by 2050. Pleasingly for Philp, progress is already being made in this field. He notes that the Alan Turing Institute has been "exploring AI

applications that could help to improve power storage and optimise renewable energy deployment by feeding solar and wind power into the national grid".

The strategy has been generally well received in the tech world, with most people acknowledging that it's an important step in the right direction. But some experts have identified a few potential shortcomings.

Peter van der Putten is assistant professor of AI and creative research at Leiden University in the Netherlands and director of decisioning and AI solutions at cloud software firm Pegasystems. He says that he is "encouraged to see a shift from broad strategic statements towards more concrete, action-oriented recommendations", but he would have preferred to see a more complete ethical framework for AI application.

"A large portion of the document focuses on AI governance, but it appears that a lot of the emphasis is still on analysis, discussion and policy-making. There is less on proposing hard legislation or determining which authority will be accountable for governance," van der Putten explains. "This is an area in which the UK will need to accelerate, given that both the EU and

China have made relatively concrete proposals for the regulation of AI recently."

Liz O'Driscoll is head of innovation at Civica, a supplier of software designed to improve the efficiency of public services. She believes that the UK has "made great progress so far, with many organisations starting to embrace data standards and invest in data skills. But the artificial elephant in the room is human resistance to data-sharing. Privacy remains crucial, especially when it comes to citizens' information, but wider uncertainty about issues such as regulation, public perception and peer endorsement will also prompt many in the public sector to play it safe with AI."

There are some encouraging signs that people's general reservations about data-sharing are softening, thanks to the success of collaborative AI solutions during the Covid crisis, O'Driscoll adds.

"Sharing data has been essential in our defence against the virus. It has enabled key public services to stay focused on people who are most at risk," she says. "Success stories have entered the public domain, so we need to make the most of these cases and continue driving further positive changes."

It's clear that more education about the benefits of data-sharing and work on AI ethics are required, but could a shortage of recruits prove to be the most significant challenge for the national AI strategy? A survey published by Experian in September indicates that more than two-thirds (68%) of UK students wrongly believe that they would need to earn a STEM qualification to stand a chance of landing a data-related job.

Dr Mahlet Zimeta, head of public policy at the Open Data Institute, thinks that the

“
The artificial elephant in the room is human resistance to data-sharing

widely held view that "the UK needs to produce more people who can code" is unhelpful at best.

"Although improving data literacy is important, we're going to need a much broader range of skills, including critical thinking," she argues. "Leaders require a change of mindset to maximise the potential of AI. At the moment, it feels as though no one wants to be the first mover, but this is why experimenting and being transparent about the results will drive progress."

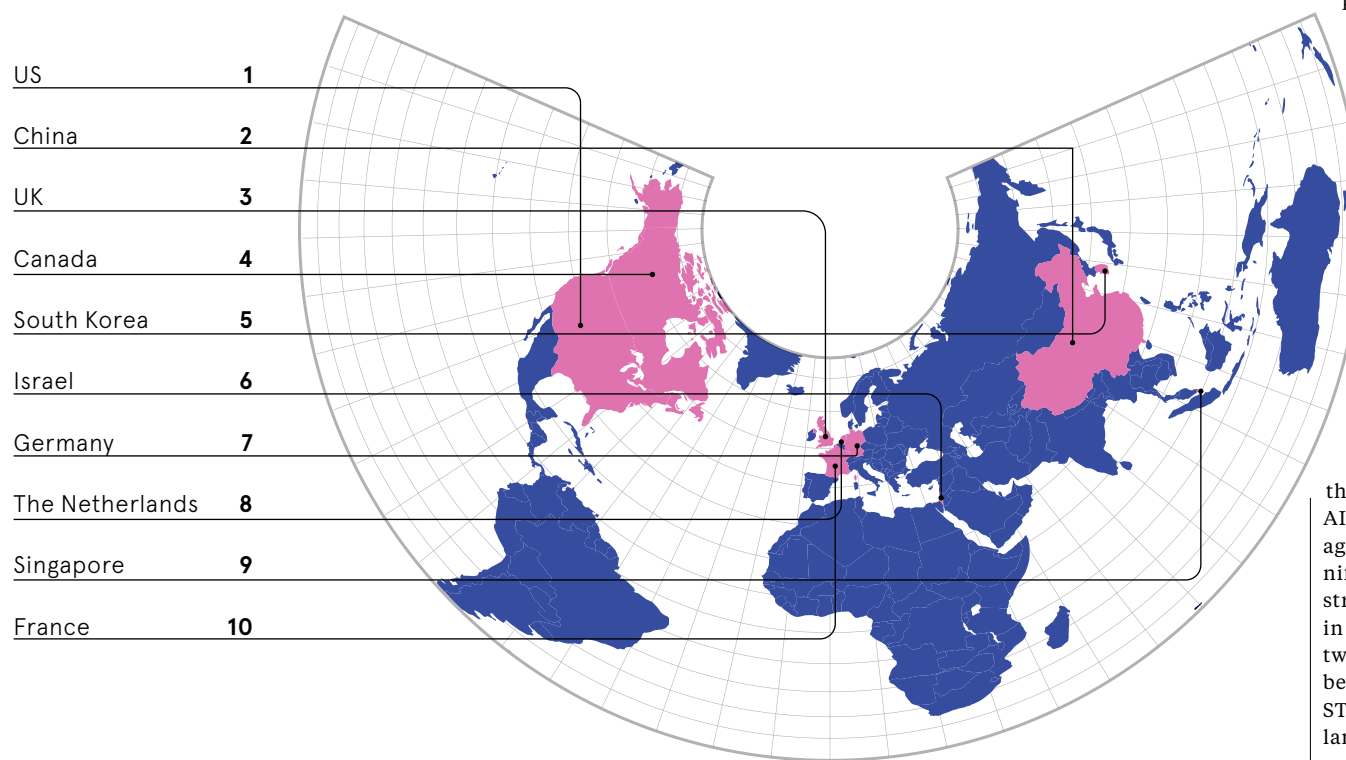
Philp urges both "students and businesses to equip themselves with the skills they'll need to take advantage of future developments in AI". For employers, this will include ensuring that their staff "have access to suitable training and development opportunities", he adds, pointing out that the government's online list of so-called skills bootcamps is an excellent place to start.

Tortoise Media's *Global AI Index* ranks the UK fourth in the world on its supply of talent and third for the quality of its research. The country is a relative laggard in terms of both infrastructure (19th) and development (11th), so there is plenty of ground to make up on both the US and China. The national AI strategy suggests that some haste will be required if the UK is to even keep these rivals within its sights. Ultimately, though, if all goes to plan, humanity stands to win. ●



THE TOP 10 AI NATIONS

The *Global AI Index* benchmarks nations on their level of investment, innovation and implementation of AI



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AI for businesses is not a DIY proposition

Artificial Intelligence (AI) is at a tipping point, says **Rodrigo Liang**, CEO of SambaNova Systems, and experts believe it will quickly become the next disruptive technology to refactor the Global 2000, just as the internet did over the past few decades



Enterprises are already using AI for a variety of beneficial uses. Computer vision, for example, has progressed rapidly in recent years. Advanced techniques enable faster and more accurate image processing and analysis for use in medical imaging, manufacturing, aerospace, and self-driving vehicles. Across industries, organisations are taking advantage of natural language processing (NLP) to understand customer sentiment better than ever, detect fraud faster, and empower people across the globe with multilingual voice assistants.

In order for these applications to be most impactful, organisations need to deploy AI at scale. While there is optimism about AI's potential, many businesses struggle to scale. They face a lack of both trained talent and computing infrastructure powerful enough to do the job.

SambaNova, the Silicon Valley AI company I lead and co-founded, recently

surveyed 600 AI, data, research, customer experience and IT leaders who largely expressed that a lack of infrastructure and trained talent has stifled their ability to unlock the potential of AI.

AI can't be a significant competitive advantage unless it's tailored to a business's unique needs. But leveraging and scaling AI requires a significant investment of time and expertise – expertise that many organisations increasingly struggle to recruit.

A shortage of talent exacerbates the barriers to scale. A lack of access to trained talent is the third greatest challenge in scaling AI, according to the survey results. If organisations want to harness the full transformative power of AI, they need to find a way around the skills gap.

Businesses that attempt to take a DIY approach to AI initiatives will fall behind. Many organisations believe they can simply build an in-house department

dedicated to AI deployment, similar to IT. What is more problematic still is when they believe IT can absorb AI responsibilities. But this approach is expensive, timely and unreliable.

SambaNova is eliminating many of these barriers. Unlike off-the-shelf AI products, which have limited flexibility, SambaNova customises AI, and the computational models that make it work, to an organisation's unique needs and is able to deploy it practically anywhere. By outsourcing the technical details of AI training, tuning, infrastructure and maintenance, businesses can focus on innovating and driving revenue.

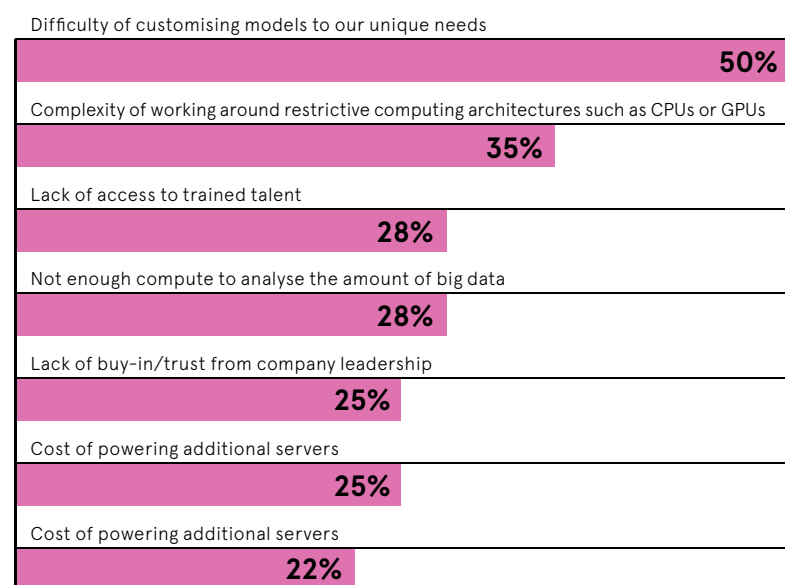
A major part of my role at SambaNova is helping customers see the potential for AI in their business or industry, based on our company's collective experience, which I truly believe is second to none. To show our commitment to making AI innovation a reality for more businesses, we've launched SambaNova ELEVAITE, a programme designed to get businesses quickly up and running with world-class AI.

The invitation-only programme is designed to support a select few companies who know the key to their futures lies in embracing AI, but they may not know quite how to get there. If this business is you, reach out to us by requesting an executive-to-executive conversation at www.sambanova.ai/elevaite and let's talk about how you can disrupt your industry with ELEVAITE and get ahead of the AI revolution.

To find out more about how ELEVAITE can accelerate the implementation and scaling of AI in your organisation and sambanova.ai/elevaite



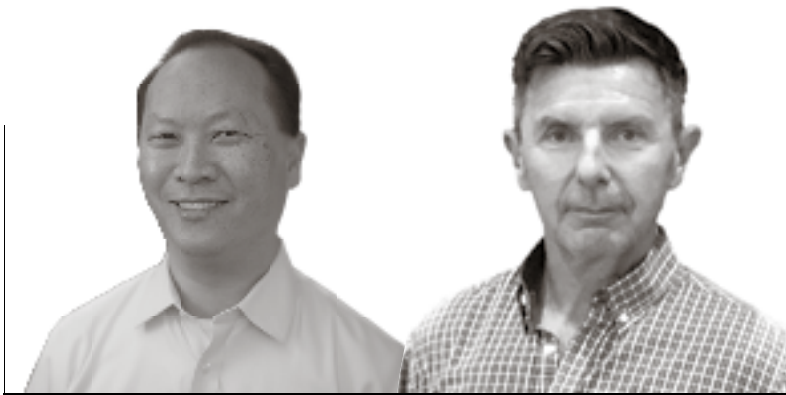
TOP CHALLENGES WITH SCALING AI/ML



Q&A

Becoming an AI-enabled enterprise

Artificial intelligence (AI) technology is reaching an inflection point and lacking a clear strategy around it is holding companies back, say **Marshall Choy** and **Chris Kenny**, vice-president of product and general manager EMEA & APAC at SambaNova Systems



Q Can you provide a description of SambaNova and its position in the AI market? What does the AI industry look like today?

A SambaNova is revolutionising the AI market. The AI industry is on the cusp of the biggest transformations in computing since the internet. SambaNova is on a mission to unleash AI's potential to solve challenges currently out of reach with today's computing technology. The transition underway is already pushing the bounds of what's possible with AI and SambaNova's technology enables entire industries to transition to AI overnight.

The UK government sees AI as a strategic investment area in order to stay competitive in European and global markets. SambaNova has established its international HQ in the UK because of this strategic focus and prioritisation of AI and deep learning initiatives. SambaNova is collaborating with enterprises and research institutions to develop the leading competitive deep learning use cases that will yield better ROI and unlock capabilities that are not accessible using existing, classical technologies.

Q What roadblocks have organisations faced with AI thus far? What competitive pressures are UK companies facing given the accelerated adoption of AI by some companies?

A AI is reaching an inflection point and businesses can no longer risk

not having it. Foundational barriers to successful deployment include a lack of clear strategy for accessing and activating data that makes AI work, a lack of talent, and functional silos that restrict end-to-end AI solutions. SambaNova enables organisations to solve these challenges in order to stay competitive and reduce time to business outcomes. The technology allows organisations to deliver faster ROI and more accurate business intelligence and insights to C-level executives. By providing both the hardware and software for AI, enterprises are in a much better position to deploy AI.

Q What do businesses need to consider before they get started with AI?

A Businesses need to identify the problems they want to address and ask the right questions in order to determine the best strategy for their AI initiatives to answer those critical business questions. Since many enterprises lack the resources needed to build their

own AI systems fast enough to compete with others that are gaining ground, identifying a partner for AI management instead of taking a DIY approach can significantly reduce costs and implementation time.

Q What is Dataflow-as-a-Service and how does it compare to other offerings on the market?

A SambaNova's flagship offering, Dataflow-as-a-Service, is a subscription-based AI hardware, software and solutions platform that jumpstarts enterprise-level AI initiatives – unleashing the power of AI not just for the Fortune 5 or 10, but for the Fortune everyone. Enterprise AI traditionally requires years of project development and large, specially-trained teams. Dataflow-as-a-Service eliminates these barriers by providing an integrated solution with a breadth of capabilities that are unmatched and aimed at getting companies' AI efforts into enterprise production scale.

EDUCATION

Hannah Fry: ditch 'crap science' and get real about what AI can do

AI is far from magic, says the mathematician and broadcaster, but it does have transformative potential – if the right applications can be found for it

Simon Brooke

Hannah Fry is getting aerated about a domestic appliance. The refrigerator in question was in good working order, but "it had a sticker on it that said: 'This fridge is AI ready.' I just don't know what on Earth that means," she says.

If she can't understand it, there won't be many people who can. Fry, a professor in the mathematics of cities at University College London, is a seasoned public speaker and broadcaster who was awarded the prestigious Zeeman Medal in 2018 in recognition of her work to improve the public's understanding of maths.

A year later, she published *Hello World: how to be human in the age of the machine*, which gained widespread acclaim and a place on numerous award shortlists. The follow-up, published this month, she wrote with geneticist Adam Rutherford, her co-host on *The Curious Cases of Rutherford and Fry*, a BBC Radio 4 series in which they apply science to solve mysteries submitted by listeners. *Rutherford and Fry's Complete Guide to Absolutely Everything (Abridged)* seeks to challenge some of the assumptions we make about the world and show us how to "bypass our monkey brains", which have evolved to "tell us all sorts of things that feel intuitively right but just aren't true".

Continuing on the theme of absurd assertions about AI, Fry recalls talking to an entrepreneur who claimed that he could use it to improve film scripts.

"He said he could tell you how to change one word in the script to make your film do better at the box office," she explains. "It's just snake oil, but it's kind of genius in a way, because it creates something where you can't possibly conduct a controlled trial, so you could never test the claim."

Clearly on a roll with debunking what she calls "crap science", Fry is particularly scornful about "an algorithm that's been used to detect the 'true pain' – I'm doing air quotes here – of someone based on their expression, to decide whether they should receive painkillers for their chronic condition. That's an example of crap science with AI stuck on top."

While it's clear that she has no time for anyone making exaggerated claims about the technology's applications, Fry stresses that it is "possible for AI to have genuine, monumental potential. Some of the papers that have been published in journals such as *Nature* and *Science* show that really good, sophisticated AI is being used."

It's therefore important to differentiate what works in the laboratory from what's possible outside it. AI may well produce useful and interesting results in a controlled setting, but that doesn't mean it will deliver these in the real world, which is a lot



“I've noticed that people have started recognising that, regardless of how they feel about maths, they have to take data seriously

more complex and random. The problems tend to arise when people overestimate AI's ability to predict human behaviour. The focus should instead be on its capabilities as a pattern-hunter, she suggests.

"Take image-recognition software that analyses mammograms, for instance. You can demonstrate that this works in a lab," Fry says. "But it's a very different matter to integrate the technology into a hospital and have it work with real patients alongside real pathologists so that it makes a positive difference instead of overcomplicating things. That, I think, is where my scepticism lies. People sometimes just see the word 'AI' and it's all sparkly and magical. It can make them forget all the other important things that have to go alongside it."

AI works best, she argues, when its use is highly targeted. Manchester firm Howz, for instance, has created an app that learns the typical electricity consumption patterns of an elderly person living alone by monitoring their smart meter. If it detects a sudden decline in activity – a clear sign that all may not be well – the system will alert that person's carers.

Why are so many people – including senior decision-makers in government and

business – getting it wrong about AI, overestimating its powers and falling for crap science? Are too many of us dazzled by the technology because of our poor grasp of STEM subjects?

"Over the past 10 years I've noticed that people have started recognising that, regardless of how they feel about maths, they have to take data seriously," Fry observes. "For this reason, the level of maths literacy – or at least the *desire* to be maths literate – has changed. But people are still quite scared of the subject. I think it will be 10 or 15 years before people are well enough trained to use these tools effectively."

In the meantime, businesses are collecting record amounts of data, even if they don't yet know how to obtain full value from it. Fry acknowledges that this is making both the public and the government increasingly concerned about privacy, but she believes that, "when you get people who understand how to extract meaning from the right kind of data, you don't need something invasive".

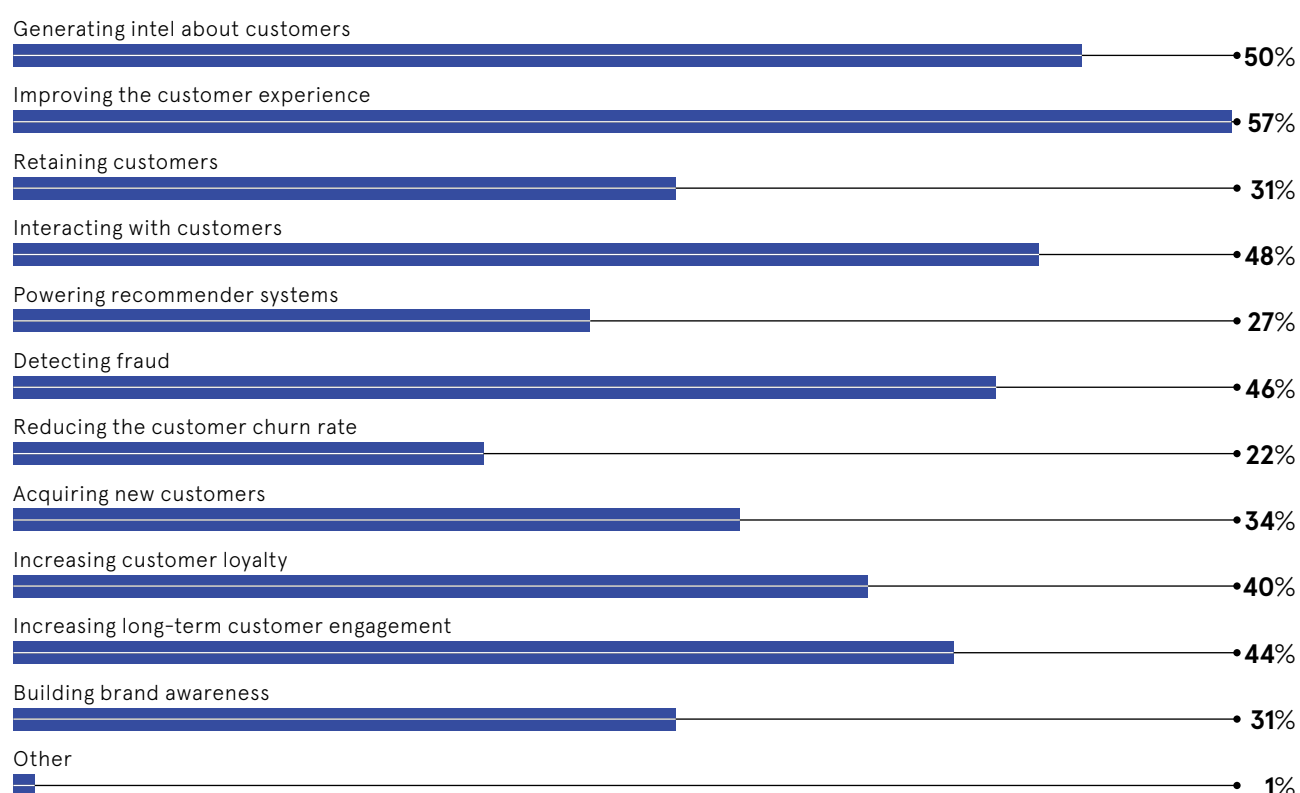
More generally, Fry's solution to the data privacy issue is for those collecting all this material to be clear about their intentions for it. If a company can prove its willingness to disclose all its data-processing policies and discuss these in an open forum, this could even form part of its ESG credentials.

"Maybe I'm being naive, but can transparency ever go wrong? Perhaps that's because I come from the world of science, which is based on knowledge-sharing," she says. "If you are open and you have intellectual humility, you invite comments. Does that ever go wrong?"

Fry's cautious optimism about our future with AI – based on practical approaches that acknowledge its limitations, along with a willingness to explain how it's being used – will strike a chord with many. Just don't get her started about that fridge again. ●

WHAT ARE BUSINESSES REALLY USING AI FOR?

Percentage of business leaders at AI-adopting firms who say they are using the technology for the following reasons



A BRIEF HISTORY OF AI

The private sector's interest in AI has waxed and waned over the years. Its enthusiasm about the technology's revolutionary potential has repeatedly been dampened by a lack of both computer processing power and data with which to train AI systems. But these problems no longer exist. The volume of material available has exploded – more than 64 zettabytes (64 trillion gigabytes) of data were created last year alone – while processing speeds are faster than the early pioneers of AI could ever have imagined. So what happened to get us to where we are today?



1950

Alan Turing presents his landmark paper, *Computing Machinery and Intelligence*, in which he speculates about the possibility of creating machines that think. He also devises the Turing test, which states that, if a computer can converse in a way that's indistinguishable from human conversation, it would be reasonable to say that the machine is 'thinking'.



1951

The first working AI programs – designed to play draughts and chess – are written to run on the Ferranti Mark 1 computer owned by the University of Manchester.

1956

US academics Allen Newell and Herbert Simon create the Logic Theorist program, which is designed to mimic human problem-solving skills. They unveil it during a summer research workshop at Dartmouth College and the field of AI research as an academic discipline is born.

1963

Thomas Evans creates Analogy, a program which shows that computers can solve the analogy problems posed in IQ tests. That same year, Leonard Uhr and Charles Vossler publish one of the first machine-learning programs that can adaptively acquire and modify features.

1965

Eliza, the world's first chatbot, is born. This early natural-language processing program could hold conversations that were so realistic that some users believed they were communicating with a real person.



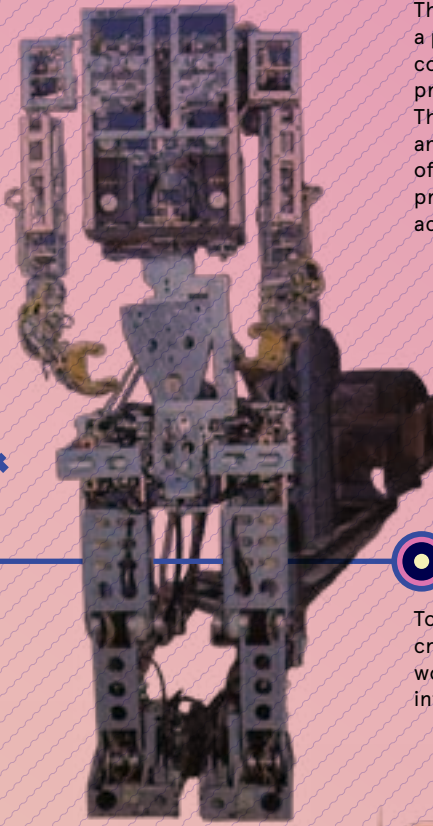
1982

The Japanese government announces its fifth-generation computer project, funding various AI-related endeavours as part of a £360m plan to revolutionise computer processing.

1980

The first AI winter. This term was coined by researchers who became concerned that enthusiasm for AI had spiralled out of control and that disappointment would surely ensue, which it did. Vast funding cuts were announced globally for AI projects.

1974



1972

Tokyo's Waseda University creates the Wabot-1, the world's first full-scale intelligent humanoid robot.

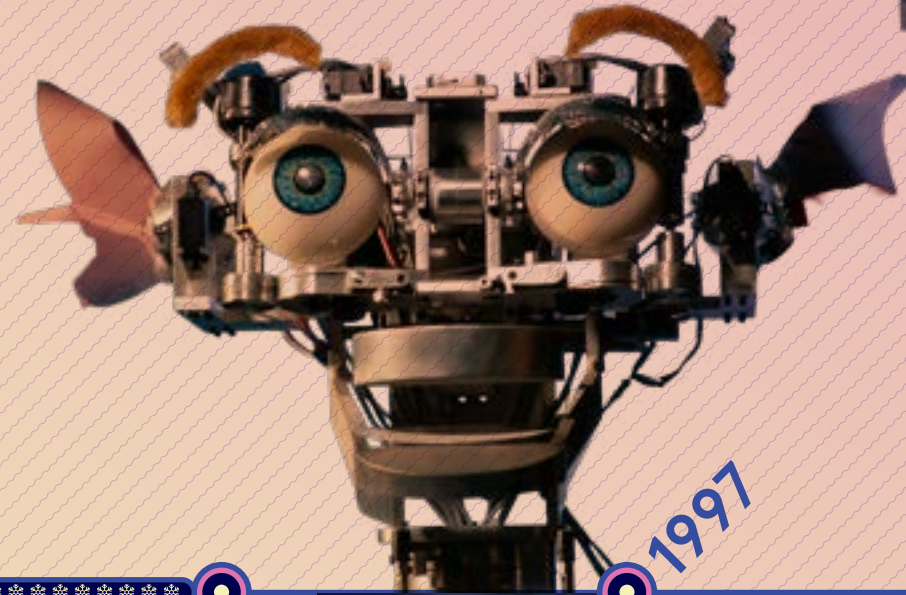
1970

Marvin Minsky, co-founder of the Massachusetts Institute of Technology's AI laboratory, optimistically tells *Life* magazine:

"In three to eight years we will have a machine with the general intelligence of an average human being"

1984

Cyc is released. This huge database was designed to get around the 'common-sense knowledge problem' present in many AI programs. It was filled with all the mundane facts the average person knows, helping machines to perform human-like reasoning based on basic knowledge such as 'Bill Clinton was a US president' and 'all trees are plants'.



1987

Programs HiTech and Deep Thought beat two chess masters at their own game.

1993

The second AI winter. By the end of 1993, more than 300 AI companies worldwide had closed down or been acquired.



1997

A busy year for AI. Deep Blue becomes the first computer chess-playing system to beat a reigning world champion, Garry Kasparov; speech-recognition software, developed by Dragon Systems, is implemented on the Windows operating system; and Cynthia Breazeal starts working on Kismet, a robot designed to both recognise and display emotions.

Late 1990s

Web crawlers and other AI-based information-extraction programs become essential in the widespread adoption of the internet.

2005

A robot developed at Stanford University wins the Defense Advanced Research Projects Agency (Darpa) grand challenge by driving autonomously for 131 miles along an unmapped desert trail.



2011

IBM's Watson defeats the two greatest *Jeopardy!* champions in an exhibition match.

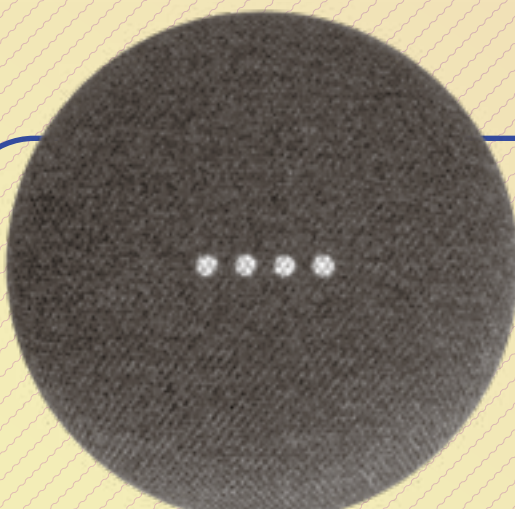
2007

An autonomous vehicle from Carnegie Mellon University wins another Darpa challenge by driving 55 miles in an urban environment, adhering to all traffic laws.



2016

Winter is well and truly over, as the annual market for AI-related products, hardware and software exceeds £5.5bn.



2018

Google Duplex, a service enabling an AI assistant to book appointments over the phone, is announced. The *LA Times* calls the AI's voice a "nearly flawless" imitation of human speech.

2020

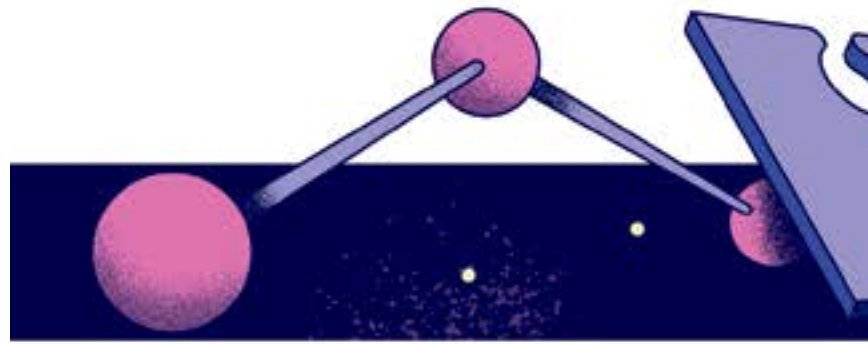


OpenAI's GPT-3 is introduced. This cutting-edge model uses deep learning to auto-complete images, produce poetry, computer code and other text, which is almost indistinguishable from that produced by a human.

CREATIVITY

Engineered ingenuity

Does AI have the capacity to simulate the distinctively human aptitude for creativity? It's not beyond our imagination, but some experts are more excited about blending the best of both powers



Nick Easen

Human creativity is the elixir that's powered civilisations down the ages. It's brought us untold breakthroughs in all sectors of the economy, from agriculture to healthcare, energy to mobility. Our imagination continues to be our saviour as the world's ageing population faces tough socioeconomic and environmental challenges.

Imagination requires us to create mental models of things that don't yet exist. It brought us the printing press, the steam engine, the light bulb, the telephone, the aeroplane, the TV and the PC. All of these required improbable acts of human invention. Yet many businesses are failing to harness their employees' creativity, even though they say it's a vital trait for success.

Martin Reeves, co-author of *The Imagination Machine: how to spark new ideas and create your company's future*, is chair of the BCG Henderson Institute, a think-tank created by the Boston Consulting Group. He believes that "we need to focus on imagination because a competitive advantage doesn't last very long anymore. If you were the leader of your industry in the 1980s, you could expect to be at the top for at least 10 years. Now that period has come down to one to two years."

Reeves continues: "This means that companies can't just focus on optimising yesterday's business model; they need to create new ones. We must generate growth through our creativity."

Computers still struggle to emulate this uniquely human process. Even the most

high-powered machines cannot imagine a product or service that's never been seen before. They can't conjure up the new iPhone or Tesla of tomorrow. (Neither can many humans, for that matter.) But the tide is turning.

Humans can disassemble and recombine learnt knowledge to conceive of new images – think of a red boat, visualise a blue car and then imagine a blue boat, for instance. A team of AI experts from the University of Southern California (USC) is researching how to emulate the process artificially. This involves a concept called disentanglement. Humans can break down the things they learn and visualise them as colours, shapes and types. We are then able to reassemble these attributes to form novel images. The researchers have replicated this process using neural networks.

"The new approach truly unleashes a new sense of imagination in AI systems, bringing them closer to a human understanding of the world," according to USC researcher Yunhao Ge, who has been leading the project.

Disentanglement isn't a new concept. Indeed, it's being used to create so-called deepfake content, typically by recombining separate images of prominent people. AI has also been used in this way to invent a new sport known as speedgate. Data from 400 popular sports was fed into a neural network. Out popped many suggestions, but the winner involved merging elements of football, croquet and rugby on a field with six-player teams, a ball and three gates.

The USC system takes a whole group of sample images, rather than one at a time, as traditional algorithms have done. The system looks at similarities between those images, which it then recombines using all the data to make something new. The process is known as controllable novel image synthesis. What's new is that the system can handle nearly any kind of data. It may eventually help in the discovery of novel drugs by combining learnt functions from existing medicines to form innovative treatments. The technology could disentangle race and gender bias to make fairer algorithms or create safer driverless

“We'll eventually get to know the quirks of these systems and be able to play them like musical instruments

cars by simulating countless crashes. The method may even be able to create new data sets by imagination.

"AI could effectively become boundless in the future," predicts Michael Conway, leader of the AI and analytics practice at IBM. "It will be able to see connections between things that humans cannot. A more advanced version will be able to look beyond the parameters we've set and offer valuable insights that humans wouldn't have even imagined."

If a more imaginative organisation is a clear goal for business leaders, the future is likely to involve technology, such as the USC's system, that could in time complement more creative thinking by employees. After all, when the algorithm was trained to create speedgate, a human still had to choose the most realistic sport to select from the countless absurd options that the system suggested. Augmented imagination is therefore likely to be the next step. The term that Reeves uses to describe a business that can gain such capabilities is "a bionic organisation".

"What will work best is AI operating alongside humans, rather than on its own," says Melissa Terras, professor of digital

cultural heritage and a fellow of the Alan Turing Institute. "The obvious way forward is to have AI process vast amounts of information and propose new solutions and to have a human working in tandem, fine-tuning the results. We'll eventually get to know the quirks of these systems and be able to play them like musical instruments, as well as choose which ideas need

further development. This is the 'imagination machine' – an act of co-creation, with computational power and intelligence complementing our own."

Humans are relatively good at counterfactual thinking. This is the ability to imagine something that doesn't currently exist but could in the near future. It is what sets us apart from any current form of

Commercial feature

Q&A

How medical AI can improve health outcomes

Sachin Dev Duggal, CEO and Founder of Builder.ai, an AI-powered software development platform, talks about unlocking the power of AI in healthcare settings



Q How has the healthcare sector's relationship with technology evolved?
A Healthcare is an incredibly busy and demanding environment to work in. When people's lives are on the line, there is little room for mistakes – and healthcare budgets need to be taken as far as they can possibly go. The UK healthcare system's relationship with technology has a varied, sometimes checkered history, that have cost billions of tax pounds and not yielded the right result or just failed.

But in recent years, new advancements in innovations like artificial intelligence (AI) and the internet of things have intrinsically linked technology with better healthcare outcomes, efficiencies and patient experiences. AI, in particular, has helped open up extremely valuable opportunities for exploration and research, while also enabling higher flexibility to previously very costly software changes. As a result, experts have been able to become even more specialised in their field, more efficient and, most importantly, more effective in their research and treatment than ever before.

Q In what ways has AI already progressed in healthcare settings?
A We have seen great progression around application development for virtual nurses, helping to bring care to a wider number of patients based on real-time engagements. AI has allowed robotics to advance at a scale previously unimaginable, and saved many lives through early detection of diseases and cancers, which humans are unable to do at scale. It has accelerated the discovery of new drugs to help combat illnesses globally. In the back-end of healthcare systems, there are also lots of obscure use-cases where AI has seen rapid progress, such as IT workflow automation, fraud detection and medical data security, which remains a challenge

amidst the industry's efforts to protect patients' records and privacy. Hospital operations can occupy anything between 20% and 80% of a healthcare professional's time, with administrative tasks distracting from patient care. By leveraging AI to streamline and eliminate those tasks, you can not only alleviate current resource capacity shortfalls but also reinvest that time into planning better patient care for the future. The benefits of AI are huge and wide-ranging, but developing these kinds of applications in-house is costly and time-intensive, which has held healthcare providers back from embracing AI's true power.

Q How can healthcare organisations embrace AI applications without having to acquire the tools and resources to develop them in-house?

A Developing AI applications no longer has to be costly or time-intensive. Healthcare professionals can now build their projects quickly and accurately at scale, without any technical expertise. Builder.ai automates the heavy lifting element associated with engineering through an AI powered assembly line. This fuses Lego-like, reusable building blocks and a verified network of experts to customise them, with deep automation that vastly reduces human effort. It allows you to build a project in a fraction of the time that it would traditionally take, and with better accuracy. Reducing the time taken to build from up to 12 months to as little as two weeks. Crucially, our failure rate is less than 5%, which means the blockers that you often get with in-house developers are now a thing of the past. And because of the greatly improved efficiency, we can not only substantially reduce the cost of a project, but also offer guaranteed pricing up-front.

Q What kind of use cases has Builder.ai worked on in the healthcare sector?
A We've brought to life some truly inspiring ideas within the healthcare sector. One example that springs to mind is in rural Kerala, India, where people didn't have convenient access to medical facilities when they fell ill. To help solve this problem we partnered with Qure, a startup offering quality care at affordable prices. Together, we built an app that connects patients, pharmacies and doctors on a single platform. Today, unwell people in Kerala can instantly connect with their doctor for advice and receive personalised treatment plans, with doctors able to prescribe medication that gets delivered directly to the patient's home.

Another example is the wellbeing app and social platform Moodit, who approached us because they wanted to enable people to take better control of their wellbeing by breaking down the stigma associated with mental health. The app we produced uses an AI-based algorithm to aggregate and analyse data in order to provide users with deeper knowledge about how to manage their own mental health. The app uses the data to predict patterns that flag mental health difficulties, offering advice and early intervention to help safeguard users.

Q How have AI-based apps supported the global response to the Covid-19 pandemic?

A Today, almost every government worldwide has invested in a national healthcare app to help ease pressure on its healthcare system through unprecedented demand, and connect patients and the general public to important services and information. These apps have enabled healthcare systems to remain efficient, reducing hospital overcrowding and waiting times while helping everyone to feel safer through such a

difficult period. They allow governments to connect patients with doctor practices, provide access to medication and treatment, and help to identify any potential exposure to prevent or limit Covid-19 reinfection.

Analysis by the University of Oxford found that for every 1% of the population that downloaded the app, it helped to reduce Covid-19 infection by 2.3%. If you calculate this in terms of staff hours worked, bed usage, admin and data processing, the overall cost of pharmaceutical intervention becomes a very expensive operation to maintain.

Another example of this is how AI was used to measure the spread of the virus and almost instantly visualize its path of transmission across a country, a city or even a town. I remember at the start of the pandemic, designing a spread detection framework (our signal framework) that used a massive amount of cellular phone data that exists out there to be able to see how the virus was spreading.

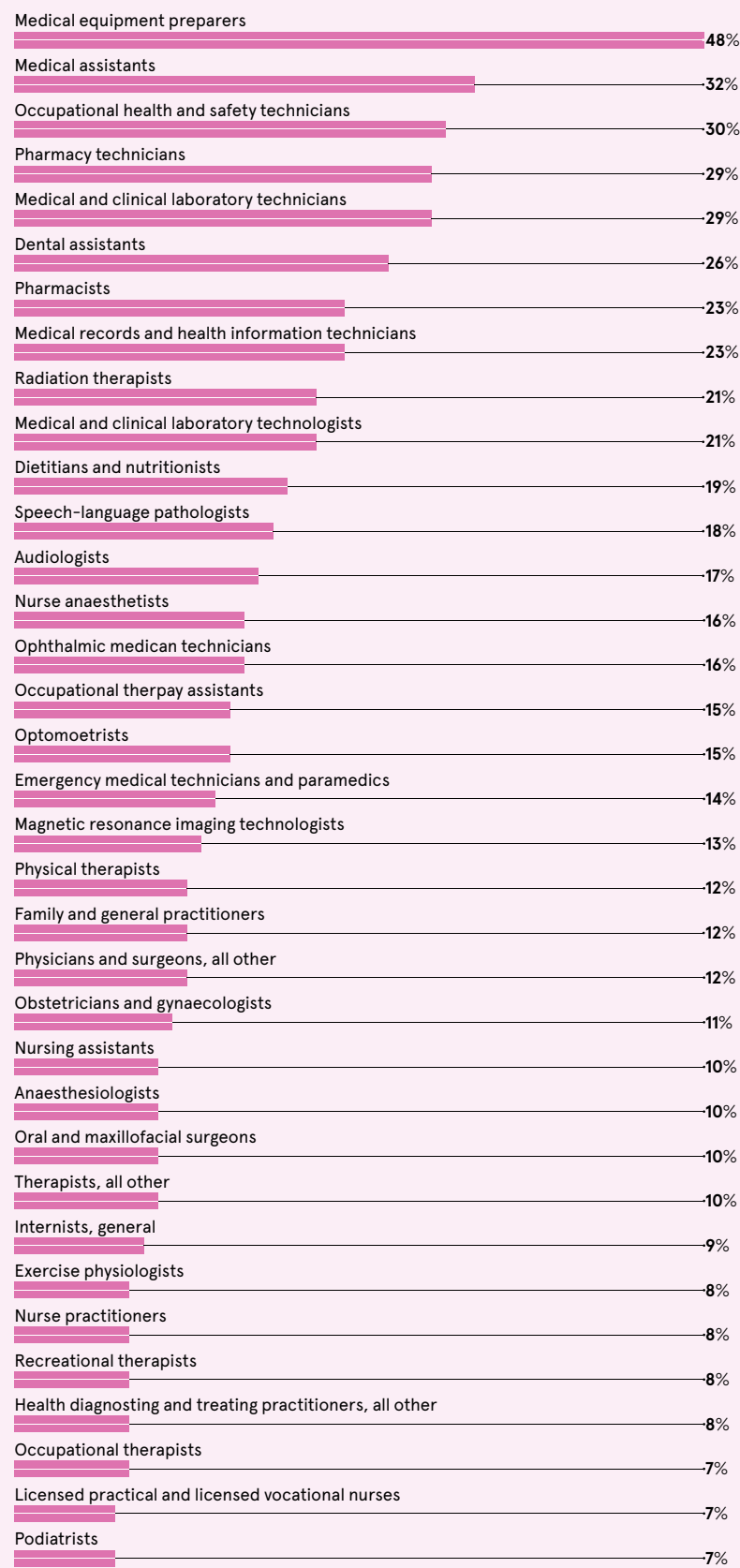
Q What is the future of AI in the healthcare sector?

A The future of healthcare can be broken into six key areas: data sharing, interoperability, equitable access, empowered consumers, behaviour change and scientific breakthrough. Software engineering is an integral part of that process and Builder.ai is helping produce software at scale, massively reducing the time from idea to reality. Our AI powered platform can accelerate efficiencies in each of these areas, increase speed and productivity, and reduce costs on a mass scale.

For more information, visit [Builder.ai](https://builder.ai)

Builder.ai

AREAS OF IMPACT FOR AI IN HEALTHCARE





machine learning. Yet companies aren't normally focused on this type of activity. Instead, they tend to be nose down in their quarterly earnings reports, dealing with the here and now or facing up to the immediate past. The imaginative spirit is rarely used to help steer businesses with a firm eye on the future, but this could change.

"I'm bullish about the bionic organisation – a more effective business that taps into both human and machine cognition," Reeves says. "The 'imagination machine' isn't just the silicon; it has a human element. If you're thinking about growth right now, you're thinking about imagination."

He continues: "In 10 years' time, when someone says 'organisation', they'll be referring to a synergistic combination of algorithmic and human thinking that gets the job done better. This raises all sorts of questions. For instance, what technology will be deployed? How do we use it? How do we match the bandwidth of machines and humans? How do we ensure that the whole organisation is serving human ends and is ethical? What do humans do and what do machines do?"

The current era of AI is about using algorithms, neural networks and deep learning to automate lower-value, higher-volume

tasks. The scale of analysis that computers can undertake puts machines in a league of their own when it comes to doing these kinds of jobs. One school of thought is that applying AI to more of this work could give humans the freedom to be more creative. But not everyone agrees.

"There is a concern that an AI-generated innovation sector may be repetitively iterating on the world that already exists, rather than transcending it," says Terras, who is also a co-director of the University of Edinburgh's R&D programme in creative informatics. "Why not let machines do what they are good at – synthesising and processing vast amounts of information – while humans deal with complexity and nuance to build products and services that will succeed for humanity?"

We still have some way to go before AI muscles in on human-led imaginative tasks and enters the mainstream in creative thinking. But, if that time comes, the increase in its potential to benefit society could mark a turning point.

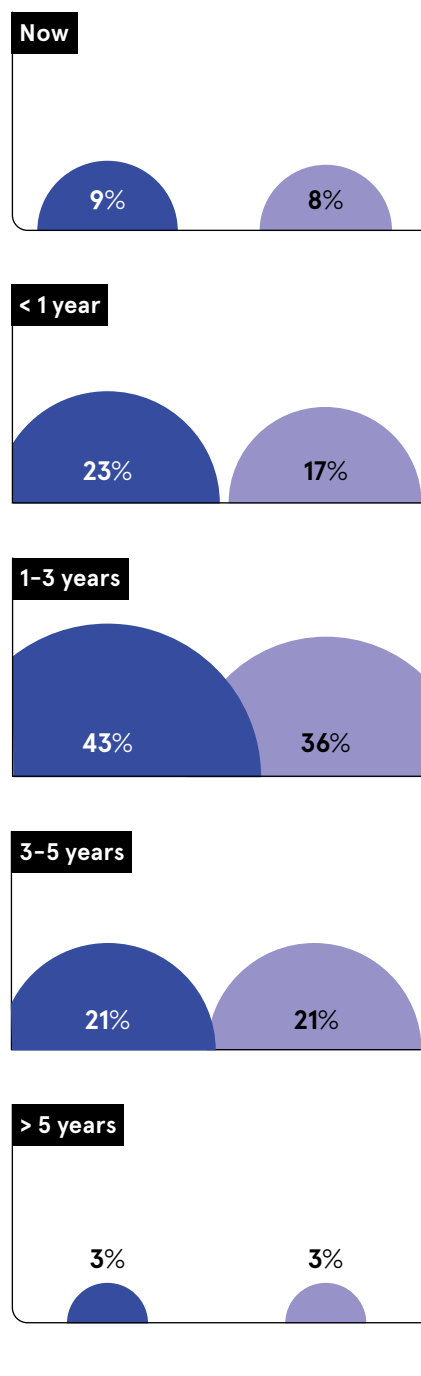
There will be less talk about automation stealing people's jobs or calls for a robot tax when the technology can create the next pandemic-beating super-drug, say, or an affordable means of capturing and storing

HOW QUICKLY WILL AI TRANSFORM THE WORLD OF WORK?

Percentage of IT executives worldwide who say they expected AI to transform their organisation and industry in the following timeframes

Deloitte, 2020

- AI will transform our organisation
- AI will transform our industry



atmospheric carbon dioxide. Then AI will be firmly cemented in society. It will also take human ingenuity to get us there.

"Will we be able to use organisational science, brain science, social science and digital science to do a better job? The answer is that we already can," Reeves says. "The focus of imagination will be the reinvention of business." ●

OPINION

'The publication of the national AI strategy is only the start of the conversation about what the UK's AI future looks like'

In September, the government published its long-awaited national AI strategy. This ambitious 10-year plan to make the UK a global AI superpower represents an opportunity to strengthen the country's position as a leading innovator.

The strategy outlined by the government is a significant step in the right direction. Now the real work must begin to operationalise it.

The good news is that we are starting from a position of strength. Recently, we have seen some significant developments in the field, including the creation of the UK's most powerful supercomputer, NVIDIA's Cambridge-1, and DeepMind's pioneering research into protein-folding. But, despite these trailblazing initiatives, the UK has a significant way to go before the full potential of AI is recognised throughout our economy and society.

What is crucial now, if we're to ensure that the benefits of AI can be felt across the UK, is that the government works with the industry and other stakeholders to spot any gaps in its strategy, plug these and focus on operationalising the key recommendations.

Many under-utilised applications of AI that could address some of our biggest societal challenges already exist. For example, the Small Robot Company, an agritech startup based in Salisbury, is using AI and robotics to reimagine farming and make food production more sustainable. It's vital that the government works with such companies at a regional level to better understand how AI solutions can be developed.

Equally, we must consider that many well-established businesses across the

country are still struggling to understand the benefits of AI and have therefore been slow to adopt the technology. To prevent them from getting left behind, the government is well positioned to provide guidance and support to ensure that the benefits of AI are felt in every sector and region.

One of the most significant announcements in the AI strategy is the government's commitment to develop a national position on the governance and regulation of AI by early next year. According to Chris Philp, minister for tech and the digital economy, during his inaugural speech at London Tech Week in September, this position will be pro-innovation and keep "regulatory intervention to a minimum" by making use of "existing regulatory structures" wherever possible.

TechUK agrees with the minister's sentiments. It's important to assess regulation on a sector-by-sector basis, taking into consideration context and application. Any technology-specific regulation would place a significant burden on businesses, particularly SMEs, and would inevitably overlap with existing regulations, creating unnecessary confusion. The government will need to work closely with industry to ensure that any developments in this space are implementable and promote responsible AI innovation.

Attracting and retaining people with the right skills remains one of the biggest challenges for AI industry players looking to expand in the UK. While the Office for Artificial Intelligence has rightly invested significantly in developing additional university courses over the past few years, it's crucial that

we prioritise training programmes aimed at the existing workforce to ensure that they're trained for the jobs of tomorrow. Educating employees will also provide them with a comprehensive understanding of how AI is being used and the benefits it can offer. This helps to build people's trust and confidence in the technology's use.

The publication of the national AI strategy is only the start of the conversation about what the UK's AI future looks like and how we get this right for everyone. What's already clear is that successful implementation is going to require considerable resources in terms of investment, time and expertise. Securing this funding in the upcoming spending review next month will be crucial for long-term success. Industry, government, civil society and academia must work together to help operationalise the strategy and ensure that it genuinely helps businesses and communities across all sectors and regions to adopt and use AI. ●



Sue Daley
Director of tech and innovation, techUK



Alleviating the organisational tension blocking AI success

Financial services firms must bring the trifecta of personas involved in an AI project – IT departments, data scientists and business managers – closer together to scale enterprise deployments

The financial services industry has evolved rapidly since the global financial crisis of 2008 spawned the rise of fintechs and, with them, a customer base with increasingly demanding digital expectations. The pandemic has accelerated digital behaviours even further, seeing technology leap over brand trust as the key battleground on which new customers are won.

Specifically, artificial intelligence (AI) is becoming the key differentiator. With digital having thoroughly eclipsed physical branches as the dominant medium of engagement for financial services, companies must now focus on personalising their customer experience through the likes of chatbots, virtual assistants and video banking. If they are not able to provide these kinds of AI-enabled experiences, their customer service will become inferior.

"If you want to drive customer lifetime value and retention, cross sell products and deliver better customer service, it has to be in a digital environment and ecosystem, and to be best in class, it must be AI infused"

"If you want to drive customer lifetime value and retention, cross-sell products and deliver better customer service, it has to be in a digital environment and ecosystem, and to be best in class, it must be AI-infused," says Kevin Levitt, industry business development lead for financial services at NVIDIA. "Financial services firms undoubtedly now see the importance of AI to their competitive position, and the need, therefore, to set an enterprise AI strategy."

Thanks to the capabilities of companies like NVIDIA and Hewlett Packard Enterprise (HPE), the computing power required to deploy AI in enterprise environments has caught up with the theory, accelerating AI projects. While some are still only discussing AI, and at the other end of the scale it is almost pervasive in some startups, most companies have reached a stage of having now enjoyed success with several smaller AI deployments and wish to scale those quick wins into something larger.

There are, naturally, technology challenges involved with scaling up AI in an enterprise, not least establishing

a coherent data strategy to underpin deployments, but the greatest challenges are organisational. A trifecta of personas is key to the success of any AI deployment – IT, data scientists and line of business – but contrasting roles and objectives can often mean they are not only speaking different languages but that there is active tension.

The efficiency of the data scientists, a highly costly resource, is critical to the success of deployments. If the data science group cannot work effectively between IT and the line-of-business project owners, the project is likely to founder. They require a strong operational path that enables them to use the tools they want, how they want, and access the resources they need, without usual IT blockers like raising a ticket or waiting for access.

"Collaboration is vital," says Adrian Lovell, chief technology officer, financial services industry, at HPE. "If you're not on top of that sort of dynamic, in the best case it's going to take you significantly longer to derive any value from your efforts, and in the worst case you're not going to get anything out of the lab and it's just going to die there as a science project. You've absolutely got to find a way to break through the friction and facilitate the collaboration that is required."

"It's about understanding that nobody wants to cause a problem. The IT people may simply feel protective over what they do for a living and don't like the idea that somebody else may want to try and change that. The data scientists may have come from academia or another industry where they were able to do everything they always wanted to do and are now adjusting to a structured, corporate environment without as many of those freedoms. And then there are the product owners saying, 'I'm trying to make money here, just get it done.'"

Amidst these organisational tensions there is also the creeping issue of shadow AI, whereby the pressure on lines of business to leverage AI-enabled applications has resulted in siloed, fragmented implementations, some in the cloud and others on-premise. There is no AI infrastructure at scale across the enterprise, leaving financial services companies struggling to get to market with the AI-enabled services that will help differentiate them.

"All these challenges are bubbling to the surface," Levitt adds. "That's the confluence of what happens when these three important pieces of the puzzle are not organised and talking to each other. Ultimately it surfaces a broken AI enterprise because there is no strategy to go with it. That's where I would say there's a lot of tension but also opportunity in terms of the conversations that we're having across the executive suite today within financial services."

Financial services organisations are looking to partner with leaders in this space to help them understand how to deploy effective AI infrastructure at

"Financial services firms undoubtedly now see the importance of AI to their competitive position, and the need, therefore, to set an enterprise AI strategy"

scale to get the most value out of one of their most valued resources: their data scientists. Many are turning to a partnership between HPE and NVIDIA, which together can provide an enterprise AI infrastructure at scale that's full stack, from the hardware up to the application suite, enabling companies to operationalise AI-enabled applications for a variety of use cases.

Waiting for a model to train for days or potentially a week is an incredible waste of a valuable resource in a data science team. The combined HPE and NVIDIA solutions help financial services firms wherever they are in their AI maturity, from those already seeing the benefits and wanting to scale that capability, to the laggards which are now realising they can't compete in the marketplace unless they develop a formidable AI enterprise strategy. Procuring solutions as-a-service can also assist the challenges between the trifecta, with HPE providing all solutions as a service through HPE Greenlake.

"It's all about the partnership when you are tackling these sorts of challenging problems," says Lovell. "I don't think anybody would attempt to try and do this by themselves. We like to work with our friends at NVIDIA because we believe in bringing what the best of breed is to our financial services customers to ultimately try and address those fundamental problems."

"We've been working with NVIDIA to help the trifecta of personas involved in AI deployments understand each other's point of view, because that's really not a technology problem. Technology can help the problem but fundamentally it's about understanding each other's point of view and seeing, frankly, that everybody needs to work together or nothing will be delivered. That's all that matters to the business at the end of the day: getting it delivered."

For more information, visit hpe.com/uk/getahead

Hewlett Packard Enterprise

NVIDIA

SMEs

Not big, but very clever

A whole host of powerful technologies are becoming accessible to SMEs. Any smaller firm considering an AI investment would do well to study how the early adopters have fared

Alison Coleman

Not so long ago, AI was the preserve of the largest organisations, mainly because of its cost and complexity. But this is starting to change. As the technology becomes more affordable, the largest hosting providers, such as Microsoft, Amazon and Google, are opening up access to shared resources and pre-packaged AI systems with offerings aimed at smaller businesses.

As AI becomes sophisticated enough to start programming itself, some leading technology providers are even delving into the world of 'citizen developers', as David Shrier, professor of practice, AI and innovation at Imperial College Business School, explains.

"This capability is growing closer," he says. "Under such a model, a small business owner would rent AI capacity from a large tech company and describe a problem verbally to that system. The computer would then write a program for itself to solve that problem."

In the meantime, SMEs can start to benefit from the AI revolution by increasing their knowledge of the technology and understanding its underpinning principles. So-called low-code or even no-code AI systems are also available for use by those with no programming knowledge.

"Small business owners can become smarter about these technologies through online courses that provide insights into the field. They should also consider hiring an expert consultant," Shrier says.

Smaller firms can adopt various technologies under the AI umbrella to enhance a range of operations. They could use chatbots powered by an expert system to

reduce their customer-service costs, for instance, or they could apply machine-learning algorithms to optimise their digital marketing expenditure.

Key factors to consider when evaluating AI systems include cost, ease of use and scalability. A smaller business will generally prefer a system that can grow with the company as its needs evolve and one that requires users to undergo minimal training. The most cost-effective way to start with AI is by applying it to relatively simple tasks on which it can have a big impact. This way, the firm is likely to achieve a faster return on its investment.

Founded in 2005, Neom Organics is a cosmetics company that employs about 150 people. The Harrogate-based firm is increasing its use of AI to automate numerous manual processes and improve their efficiency. But its overriding goal is to improve the customer experience it offers.

The company has developed a sophisticated technological infrastructure that it calls Neom IQ. This system gathers data from across the business and uses it to power various AI-driven models, including stock demand forecasts, financial performance projections and the creation of personalised product recommendations for online customers.

The company has worked with a couple of AI consultants to "build out the ecosystem" and is now bringing in more experts in data modelling and machine learning, according to its CEO, Oliver Mennell.

"Once the system is set up, it isn't complex to run, but it does rely on having best-in-class data integrity," he says. "We work with some of the best technologies for our



Morsa Images via Getty Images

“Once the system is set up, it isn't complex to run, but it does rely on having best-in-class data integrity

data warehousing, reporting and marketing capabilities, but have developed our own predictive modelling and personalisation tools in house."

SME leaders don't need high-level technical skills to adopt AI systems, but they

do at least need to understand the basic terminology, the kinds of problems the technology is good at solving and the type of consultant they'll want to hire to help them implement it.

Mennell adds that it's "also critical to have a technology strategy and oversight of how these systems are being used in your business, because they will eventually disrupt most, if not all, industries".

Although several sophisticated and costly AI systems were available to Neom, it chose a relatively cheap, simple and adaptable option. This enabled Mennell's team to become more hands-on with the data and build their own models.

"As we develop, we're adding more and more complex data sets and sources into the system," he reports. "We're finding

more innovative ways to use this data to improve the customer experience."

By analysing huge amounts of data, detecting trends as they develop and recommending potential responses, AI offers smaller firms a much-improved ability to forecast new areas of demand – a key factor in fuelling their growth. But any SME leader who's planning to bring AI into their company first needs to be aware of a couple of important caveats.

A key challenge for them is to ensure that any inherent bias, based on factors such as age, race and gender, is eliminated. They must also satisfy themselves that the people creating the technology haven't embedded their prejudices within it.

Will Richmond-Coggan is a director at Freeths, a top-50 UK law firm by revenue,

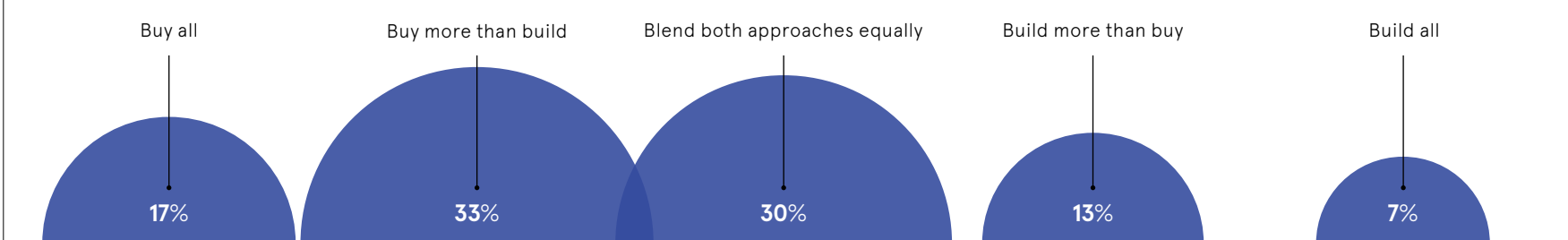
who specialises in issues concerning technology and data privacy. He would advise any SME leader to "find out how the AI has been trained and what steps have been taken to eliminate or control for inherent bias in any training data set. You will need expertise to understand the answer. Such concerns can best be allayed by proper due diligence when you're making purchasing decisions."

Data protection can be another area of concern for SMEs. The specific rules within the General Data Protection Regulation that govern automated decision-making require additional safeguards. This means that smaller businesses will need to give more thought to how they inform employees and customers about what they are doing if they adopt AI systems. ●

TO BUILD BESPOKE OR TO BUY OFF THE SHELF?

Percentage of IT executives worldwide who say they buy in AI capabilities versus building their own solutions

Deloitte, 2020



fetch.ai

Commercial feature

How Fetch.ai's collective learning models are transforming healthcare

"Data is the oil, some say the gold, of the 21st century," said Joe Kaeser, the former CEO of Siemens. That was three years ago, but in the healthcare sector it has taken a pandemic to really bring to light the prescience of his message

The pandemic, however, has exposed a wider systemic flaw in the way monolithic systems manage and distribute data, which is creating waste, stymieing collaboration and, in some cases, costing lives. A lack of interoperability in the first wave of the pandemic, for example, prevented best practice learning being shared quickly and efficiently and sometimes not at all.

Poor integrated data-sharing frameworks between the NHS and care sector systems led to many Covid-positive patients being transferred from hospital to care homes last winter and increasing the spread of the coronavirus.

Creating a cost-effective solution, which dramatically improves interoperability across healthcare systems, is a challenge that Humayun Sheikh, the CEO and founder of Fetch.ai, is using collaborative artificial intelligence (AI) technology to solve.

Fetch.ai works with several industry-leading clients in a myriad of different sectors, including automotive, energy, finance, transport, mobility and travel. But, for the last two years, it has also been working jointly with several public and private hospitals across the globe, gathering datasets to develop AI-driven collective learning solutions.

So, how will Fetch.ai's collective learning model be a game-changer?

Sheikh, whose chief ambition is to "make machine learning and AI universally accessible", says, "our preliminary research revealed that large healthcare organisations were using multiple systems, none of which were interoperable. The cost of moving data between them was significant. Our collaborative learning solution, which is now fully operational and ensures the seamless flow of data between systems, can reduce almost 90% of their costs."

Instead of relying on last generation systems to move the data, Fetch.ai has created a decentralised system which allows the training of machine learning algorithms without requiring that the data be transferred. Using the collective learning system, the algorithm can get the benefits of the bigger global dataset while being trained on smaller localised datasets.

“To unlock the true potential of AI, we need to make it accessible to all. Individuals as well as SMEs can immensely benefit from the transformation triggered by collaborative AI

The AI-trained algorithms may create a quick and cost-efficient way of sharing data, but how do they revolutionise healthcare outcomes?

Sheikh, a seed investor and commercial technologist at DeepMind, points to a collective learning experiment, undertaken by Fetch.ai, which used data from chest X-rays to rapidly diagnose whether or not patients have pneumonia or COVID-19.

"The machine learning algorithm that we have created evaluates hundreds of undiagnosed scans," he says. "The algorithm then learns how to diagnose them, creating a model, which is then shared with other hospitals in the collective learning network. What is ground-breaking is that the hospital can agree on the most effective model and then choose to adopt it, should it wish to."

If collective learning is widely utilised across the healthcare sector, Sheikh believes that it could potentially herald a radical sea change in how we use diagnostic tools.

"When it first surfaced in December 2019, virologists and frontline medical staff knew very little about how Covid-19 was transmitted, how it spread and how it could be best treated. The more that clinicians across the globe use AI-driven collaborative learning tools, the greater chance they give themselves of uncovering medical breakthroughs in the future."

"Decentralised health models – that turn centralised paradigms on their head – are the future", says Sheikh. "The concept is sometimes challenging to grasp but patients don't need to understand how complex algorithms work. They just need to see that the benefits that collective learning and the AI-centric machine learning algorithms that underpin them, bring to their lives."

It begs the question too, if data is the 'oil, or gold of the 21st century', then what value should we place on artificial intelligence?

Over to you and your researchers, Sheikh...

For more information please visit fetch.ai

fetch.ai



Duke photographer via Gettyimages

WAREHOUSING

Christmas stocking: how better inventory management could salvage the season

The festive period won't be very cheerful for retailers if their supply problems persist, but warehouse AI will give them a better chance of keeping their customers happy

Rich McEachran

A winter of retail discontent is looming for consumers in the UK. Post-Brexit border delays and HGV driver shortages are already leading to empty shelves in supermarkets around the country. There could even be no turkey for dinner this Christmas.

The Food and Drink Federation has warned that shoppers can expect not to find all the products they want whenever they want them for the foreseeable future. Its CEO, Ian Wright, told an Institute for Government event in September: "The just-in-time system is no longer working. I don't think it'll work again."

“The promotion of products that aren't yet in the warehouse – or even in the country – is a fast track to customer disappointment**”**

Retailers and their fulfilment partners are seeking ways to navigate this sticky situation. AI could offer them at least some of the answers.

When people think about AI applications in retail, they might immediately envisage robots picking and packing products at speed in a fulfilment centre, with drones hovering above them, on the lookout for potential problems. These devices will indeed be a common feature in the warehouse of the future. But the AI-based technologies of most benefit right now are those that can offer firms a better handle on their supply lines and inventories.

As shoppers become more accustomed to seeing out-of-stock notices, both online and offline, their purchasing decisions are likely to change – as will demand signals. So says James Hyde, founder and CEO of James and James Fulfilment, which handles warehousing and order fulfilment for

hundreds of small retail brands. Given the ongoing delays to inbound stock, Hyde notes that there is "now a great opportunity to revisit the slow-moving product lines that are clogging up expensive warehouse space".

When integrated with internet-of-things technology and enterprise resource planning software, AI systems can constantly monitor stock levels and adjust their demand forecasts as stock flows in and out of a warehouse.

Although fulfilment companies cannot control delays upstream of them, they must do their utmost to minimise any disruption during a product's time in the warehouse that might impede its progress to the customer, says Daniel Hulme, chief AI officer at marketing giant WPP.

"The ineffectiveness of fulfilment is a primary cause of customer dissatisfaction. AI can help firms to achieve exponential efficiencies in warehousing, distribution centres and the last mile," says Hulme, who sold Satalia, the AI consultancy he founded in 2007, to WPP in August. It has previously worked with Tesco to optimise its last-mile delivery processes.

He suggests that companies could use digital-twin technology to improve their control. In essence, a digital twin is a virtual model of a physical asset – in this case, a warehouse – that updates itself in real time. "This living simulation can connect and orchestrate components of the supply chain," Hulme says.

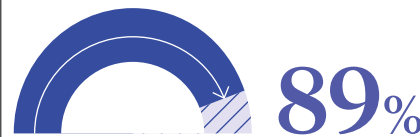
Companies can use the data generated by the digital twin to anticipate problems well before they strike. They can even apply it to inform their marketing campaigns, according to Hyde.

"Retailers need to be proactive in using promotions to control the sales process, both to maximise sales and to minimise the risk of fulfilment delays caused by excessive demand," he says.

For instance, sales promotions on slow-moving product lines should be prioritised over popular lines to prevent overstocking and understocking. At the same time, "the promotion of products that aren't yet in the warehouse – or even in the country – is a fast track to customer disappointment," Hyde warns.

Although businesses are generally aware of AI's potential benefits, some are struggling to use it optimally. That's the key finding of a survey of 350 warehouse managers in the UK and the US by Lucas Systems, a specialist in warehousing technology. The consensus among the respondents was that AI could give them a return on investment of 60% within five years of its adoption. Yet 99% admitted that they were finding it hard to make the best use of the technology, while 90% said that they needed more support with implementing it.

"There is a huge misunderstanding about the capability of AI, which leads to so many companies getting this wrong," Hulme says. One common misconception that companies have about AI is that it's costly and involves a highly technical set-up, he adds. Another is that it's only truly beneficial to companies that are handling a high volume of products.



89% of people working for companies with warehousing operations across the UK and the US agree that effectively implementing AI-based software in distribution centres can provide a competitive advantage



90% of those expect an increase in productivity from their use of AI



90% expect an increase in both activity and responsiveness



80% agree there is a general lack of understanding of how AI-based software can be put into practice to enhance warehousing operations

Lucas Systems, 2021

Hyde says that there has never been a more appropriate time for retailers and fulfilment companies to adopt AI. Preparing for the festive period is always a challenge but, given the lack of HGV drivers on top of a general staff shortage this year, businesses will find it harder than usual to cover any spike in warehouse demand.

"Vague promises aren't good enough," Hyde stresses. Customers expect immediate service, but this will not be achievable with the current bottlenecks. By using AI-powered tools to keep on top of inventory, retailers can make realistic delivery pledges, he notes, adding that customers would rather receive their goods within an agreed time slot than be offered a next-day service that's impossible to provide.

Retailers should be asking themselves how quickly warehouses can respond to customer demand and get products dispatched, according to Hyde. And key to this is knowing exactly what's in stock at any given point and which product lines need to be promoted.

"Careful planning is vital if retailers are to get the most from peak trading season and, crucially, keep their promises," he concludes. "Retailers need to know at all times what they have and when they can deliver it." ●



Advanced AI the missing ingredient from cyber resilience

British companies are among the most likely to blame ill-fitting security tools for cyber attacks. Intelligent technologies are increasingly being used to bolster enterprise defences, but many businesses lack understanding around the right tools to choose and how to apply them effectively

Among enterprises in the UK, executives estimate that close to half of their cybersecurity expenditure is on tools that use at least some form of artificial intelligence (AI) and machine learning (ML) – ahead of the US, Japan, Australia and New Zealand.

Nevertheless, new research reveals 57% of large businesses globally still experienced a damaging cybersecurity attack in the last year, despite having AI and ML in place, as they grappled with technological uncertainty and budget limitations.

With nearly one-third of UK businesses worried that they do not have the right tools in place, the problem is far ahead of other regions, according to the research conducted by the security and data resilience experts Carbonite + Webroot. At the crux of the issue is a lack of understanding of the technology, and also – in a worrying number of cases – a limited desire to know more, with two-thirds of UK enterprises agreeing with the statement they "don't care" if their cybersecurity tools use AI or ML as long as they work.

The tendency to turn a blind eye is equally apparent among small and medium-sized enterprises, among which four in 10 globally have experienced an increase in cyber attacks since the beginning of the Covid-19 pandemic. While most have the perception that they use cybersecurity tools, application is low. Little more than half of UK SMEs use antivirus or anti-malware protection on company devices, and even fewer regularly run software updates or frequently back up data.

Matt Aldridge, principal solutions architect at Carbonite + Webroot, the OpenText companies behind the research, believes that the prevalence of hybrid working means businesses must urgently improve their understanding of cutting edge security technology.

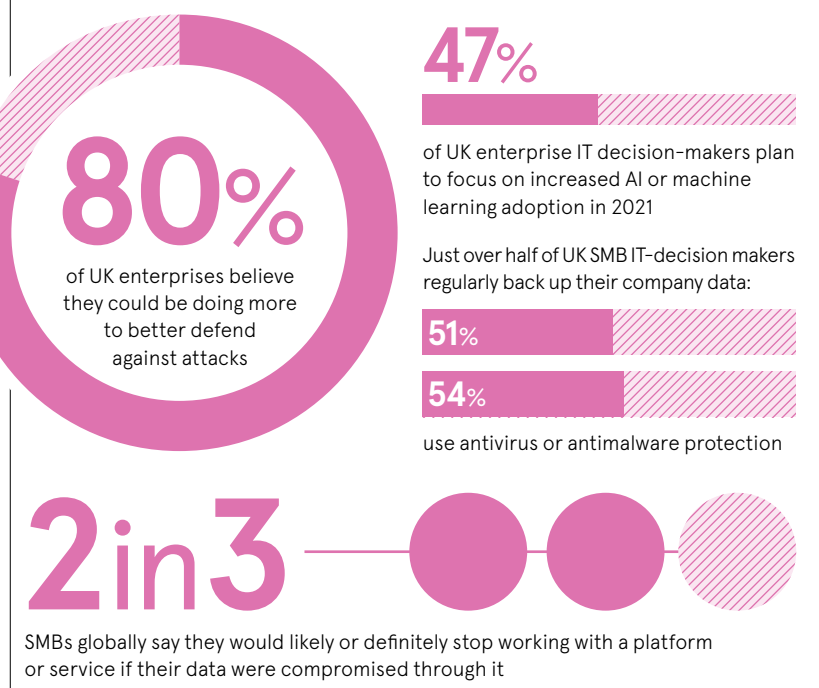
"Artificial intelligence and machine learning, when applied well, offer powerful protection against attacks and data loss – automatically strengthening threat detection and prevention, and constantly self-improving with the right human support. Ultimately, their proper integration means businesses can find the problematic needle in the haystack of activities."

Awareness of the role of AI and ML is at least growing, and both enterprises and SMEs increasingly view such systems as important to addressing threats. Many now have an ambition to methodically

“Artificial intelligence and machine learning, when applied well, offer powerful protection against attacks and data loss**”**

PERCEPTIONS AND MISCONCEPTIONS ON AI AND MACHINE LEARNING IN CYBERSECURITY

Webroot, 2021



advance their approach, bringing in service providers to help them on the journey. AI security capabilities can be deployed in myriad areas, and among UK businesses they are most commonly used for threat alerts and detection, automated network analysis, email scanning, pattern recognition and threat hunting. Carbonite + Webroot's research reveals. These tools also support user behaviour modelling, employee awareness training and faster response times.

But Aldridge notes that having proper appreciation of how these tools work, and where they can be used to maximum effect, is a growing challenge for businesses when "the sheer number of options out there, and the varying claims around AI and ML, make it difficult to compare and choose."

The array of choices has fed into scepticism among executives around the use of the technology. About one-third of large UK businesses are unsure what their vendors really mean when they say tools include AI and ML, and globally 60% feel product marketing is often purposefully misleading.

Nevertheless, companies recognise the need to do better, and in the UK over a third of larger firms are planning to invest more in cybersecurity software. 30% are looking to improve security awareness training, and more than a quarter will invest in cybersecurity solutions based on AI and ML. Employee training will also be essential to success in these contexts, never more so than for SMEs where budgets often do not stretch to having dedicated security staff.

"With AI and ML so necessary for resilience against ever more sophisticated threats, it is essential that businesses more deeply understand the technology for better selection and application, and educate internal teams and end users on the benefits of these solutions so that they can respond better to cyber threats," says Aldridge. "Clear

articulation of the advantages of the technology can also differentiate businesses strongly for customers."

Companies around the world already work with Carbonite + Webroot to establish comprehensive endpoint and network protection, threat intelligence, website classification and phishing prevention, data backup and disaster recovery, as well as immersive security awareness training for employees. Its AI and ML detect and prevent malware and phishing, constantly being trained and updated on the latest threats by accessing vast data lakes and cutting-edge supercomputing analytics.

"The key for businesses maintaining cyber resilience is a blend of proactive security, based on ever more accessible AI and ML systems, and on backup and disaster recovery," says Aldridge. "Getting this right is essential as complex threats proliferate, and it relies upon not just careful selection but also effective staff training so that employees can get the most from the technology and spot any security gaps."

Given the rapid expansion and sophistication of cybersecurity threats to businesses worldwide, carefully applying artificial intelligence and machine learning tools is now a fundamental means of establishing resilience. To succeed, organisations globally need to better understand this technology, and work with the right service providers to maximise the effect of its application.

To find out more about AI and ML for cyber resilience visit webroot.com/AI-ML

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advice to any business leader who suspects that employees are more wary than excited about their firm's impending adoption of AI would be to make it clear how the technology could make their working lives easier.

"Show people how the introduction of AI will benefit them," she suggests. "If it is taking over work, what new tasks would those affected then be expected to do? Do they have the right skills and are these tasks aligned with their career aspirations? This is an opportunity to redesign work so that it improves the quality of jobs and also to consider how staff can be supported to advance their careers."

Money Penny, a provider of outsourced customer communications, has been using AI software as a service (SaaS) "for years", but began introducing its own deep learning systems in 2020, says its chief technology officer, Pete Hanlon. The company employs about 850 personal assistants, who handle more than 20 million calls, live chats and digital communications a year on behalf of 21,000 businesses in the UK and the US.

"Our challenge was to unlock the speech-based conversations we have each day to gain insight, allowing us to help our PAs serve our customers' customers better," he explains. "It was impractical to convert phone conversations into text manually, because we handle hundreds of thousands of hours of calls every day. It was also prohibitively costly to use SaaS provided by the large tech companies. Instead, we focused on training our own speech-to-text models, fine-tuned to work with our PAs' voices."

Money Penny also uses deep learning systems to "determine intent and sentiment". This helps the company to ensure quality and enables staff to handle customers' calls more quickly and efficiently. Common conversations can be identified, giving the company scope to improve the FAQ guidance it provides.

"We're integrating these technologies into our in-house systems to help our PAs, pulling up relevant information as calls are happening," Hanlon says.

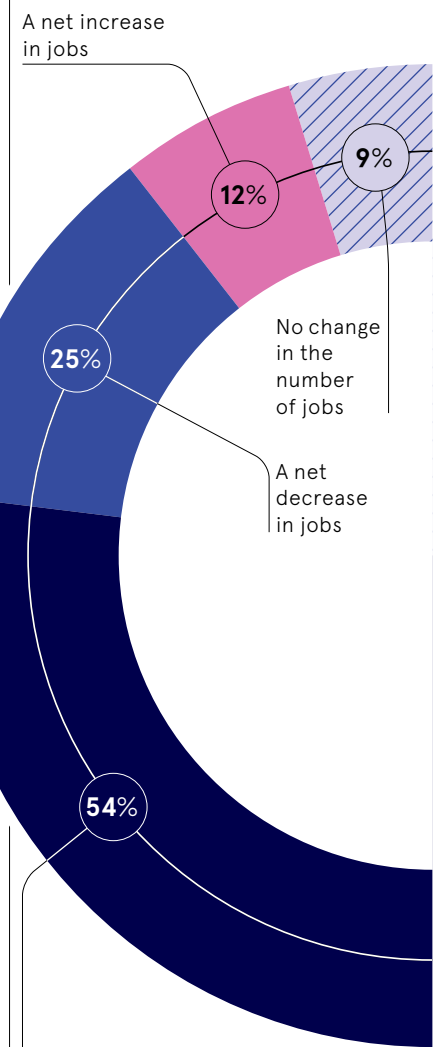
Mohdzaini would advise any business leader sensing resistance in the workforce to the introduction of AI to keep three principles in mind. They are: minimise uncertainty, get employees involved in the process and show them how they can benefit from the changes.

"An HR director once told me that it is sometimes a tough message to give. Despite this, people will look back and thank you for being honest," she says. "It might even improve your company's brand as a good employer."

Mohdzaini stresses that implementing AI needs to be done sensitively. Remember that change will always make people feel uncomfortable. Don't allow rumours about redundancy to swirl. Instead, have

HOW AI COULD AFFECT JOBS

Percentage of business and HR leaders who think that AI will affect the number of jobs in their organisation in the following ways over the next three years



The same number of jobs, but the nature of those jobs will change

Deloitte, 2020

CHANGE MANAGEMENT

Automation trepidation – tackling the AI fear factor

People's anxieties about losing work to technology are becoming increasingly well founded. Any business adopting AI should therefore manage the process with great sensitivity

Katie Byrne

The World Economic Forum's *The Future of Jobs Report 2020* estimates that 85 million jobs could be "displaced" by AI before 2025. Whether you treat the technology with suspicion or embrace it wholeheartedly, one thing is certain: it's here to stay.

"There will be a change in many, if not most, jobs," predicts Naeema Pasha, co-author of *Futureproof Your Career*. "We'll see more of it at work. There'll be more use of its facial-recognition capabilities, for instance, while conversation tools such as Amazon's Alexa will move beyond our kitchens into our workplaces. We'll use AI-based payment systems. As such, more and more roles that we might identify as 'administrative' will become AI-based."

While such predictions may reinforce fears that a soulless robotic workforce will

render the human touch obsolete, the same World Economic Forum report also suggests that AI could contribute towards the creation of 97 million jobs.

While the uptake of AI by employers may feel daunting for many people, the new career opportunities it's likely to create should be exciting, according to Pasha.

"We're in for a big change," she says. "Business leaders are already encountering the new job clusters, fuelled partly by the rise of the robots. We are seeing an increase in the number of jobs that require human ingenuity and creativity, not only in technology but also in human development and social impact. Over the past year we have seen a 75% increase in the number of jobs in diversity, for instance. And then there's the need for green skills and the rise of roles such as chief climate

officer. Business leaders have a chance to remould workplaces, building human, social and environmental goals into their purpose and strategy statements."

The adoption of AI could enable people to remove dull, routine and perhaps even dangerous tasks from their to-do lists, Pasha observes. "As the technology becomes more integrated, employees will require training to operate it. They will also need to use skills such as creative and critical thinking for technology adoption. We need to look at newer job functions that are more human – and, possibly, more interesting."

Hayfa Mohdzaini is a senior research adviser in data, technology and AI at the Chartered Institute of Personnel and Development, a professional association for HR practitioners. She says that her

"honest two-way conversations with staff as early as possible and give them opportunities to shape how the change will affect them," she suggests. "While you may not be able to implement all of their suggestions, you can acknowledge these and show which ones you're planning to implement now or later. Keep your communication channels open."

At Money Penny, staff are kept firmly in the loop about developments. Hanlon reports that their responses to its adoption of AI have generally been positive.

"We issue regular business updates outlining our work in this area and why we are doing it," he says. "We feel that people are the key and that technology can help to empower them. This is not about replacing people. This is about making them the best they can be." ●

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