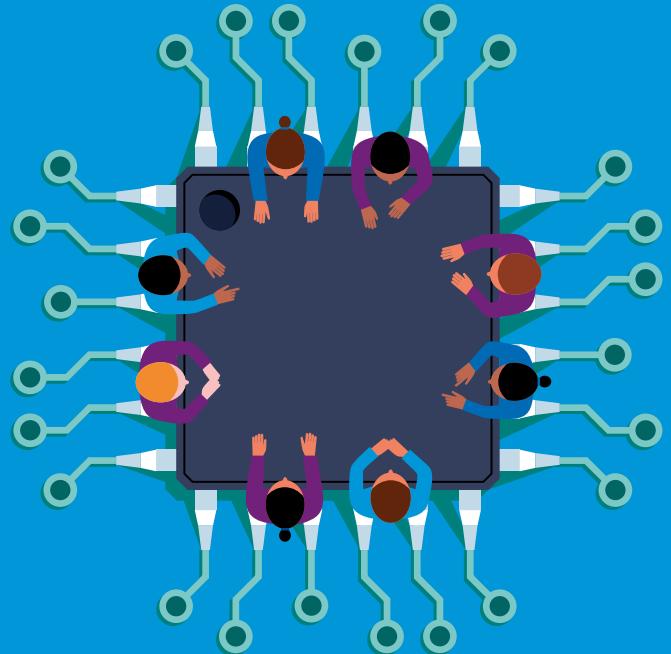




Advantage AI

**AI is ready to transform your business.
Are you and your workforce ready?**



The race has begun

If you still believe that AI is something that's going to transform business some day in the future, now would be a good time to think again – because the business applications are emerging, fast. The time has come to write a new road map to the future.

Artificial Intelligence, or AI, is at the tipping point. It's no longer a matter of 'When will it happen?' because the technologies in question are already available, and are already transforming enterprises. If you don't take the AI advantage, your competitors soon will. Once they start getting it right, you can expect them to gain a competitive advantage, fast.

What's more, this technology is transformative: its potential lies beyond replacing a process here or a system there. Instead, it can be the catalyst for a fundamentally new business model – one that will make you the disruptor, not the disrupted.

But just as with any new technology, buyer beware. There are platforms that look good, but perhaps are not suited to your needs, and could set you back years. My belief is that you should start with the business need, and ensure that the technology is a proven enabler.

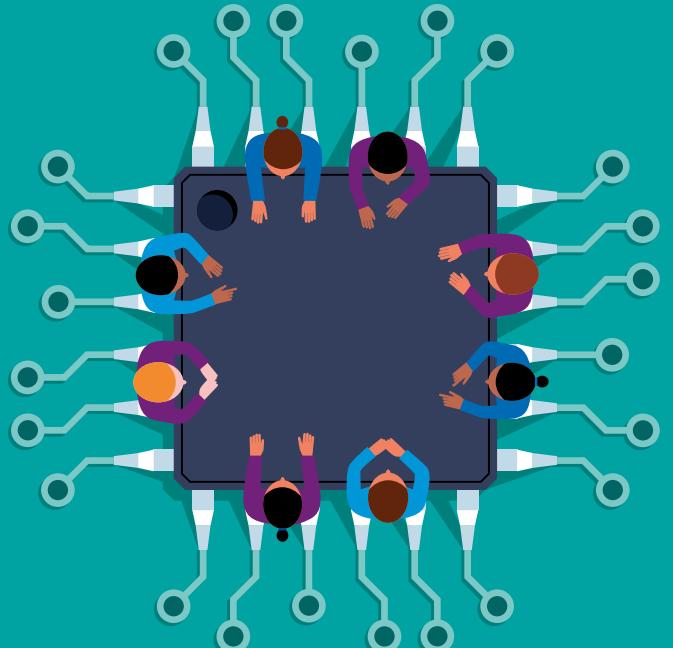
In this collection of insights, we report on the workforce and people implications that enterprises must face at this point: the very beginning of their AI journey. Choose the right path, and the advantage is yours.



Shamus Rae
Head of Digital Disruption
KPMG in the UK

Introducing the boardroom 'bot

From offering an unbiased perspective based on management information, to making critical judgements based on analyses of massive data sets, the potential for AI to augment the capabilities of boardroom leaders is huge. Shamus Rae, Head of Digital Disruption at KPMG in the UK, reviews the scale of the opportunity.



AI is coming, bringing with it a wave of disruption and opportunity for businesses. And while automation continues to fill headlines, that change won't just be reserved to the factory floor or the back office. It'll take place right up to the level of the boardroom.

Many boards are already acting on information and even recommendations from AI systems, even if perhaps they aren't aware. Already, AI systems are producing data and opinions on markets, doing risk analysis, combating fraud, looking at compliance – the emerging field of 'Regtech' – and producing insights.

Augmenting the board with AI isn't a threat. According to KPMG's 2017 Global CEO Survey, 65% of CEOs see disruption as an opportunity for their business. Cognitive systems can improve quality and efficiency in everything from everyday processes to strategic decisions.

Take next year's budget: if you ask your own sales force to make predictions, data shows they are likely to be over-optimistic. With an AI system, a sales leader can look at economic data from target markets, marketing spend, market position, and various other factors, and generate a less biased prediction, and eventually the system will be able to make recommendations.

Automation around due diligence and regulation will be among the first systems to be adopted widely, for example in acquisitions; several startups are working in this area already. In human resources, we are already starting to see companies adopting smart systems to analyse performance, staff and customer satisfaction, and company culture, to give a more holistic picture of an organisation.

Despite headline-grabbing efforts by one or two companies, we're yet to see the meaningful adoption of an AI as a board member just yet. That may happen, but in the near term it's likely that cognitive systems will increasingly augment the C-suite's decisions. Preparing for this new future will be the differentiator between the winners and losers in the coming cognitive disruption.

It all starts with data

There are a number of steps businesses can start taking now to prepare. As ever with AI, the most fundamental issue is data. Almost all large organisations are undergoing master data projects, creating 'data lakes', and increasingly complex management systems. The problem with big data is this: you get your data together for a brief period of time, and then the governance around it falls apart.

At KPMG, we have asked what data it is that will differentiate us in five years' time. We have looked at the cognitive systems that we want to be building and asked: what data must we collect in order to train those

systems? How do we collect it in an unbiased way? It's easy to have a set of goals around AI, but to not think about the training data you will need to get you there. Prioritise the data that matters: that which is crucial to your business advantage, and the data you are going to need in order to train new cognitive systems. Start collecting that today.

Challenge yourself – before it's too late

It took just 30 years to go from the invention of the digital camera to the end of Kodak. Today, that same process could take just five years. And the number of Kodaks – industry leaders totally disrupted by innovative competitors and resistance to technological change – in the next ten years is going to be vast. We have to ask: the traditional management were good at pulling the operational levers to get us through the last ten years – but will they get us through the next decade?

Companies taking the lead with AI are already grappling with this question. A significant 68% of CEOs have taken steps to disrupt their role in 2017, while 25% of organisations now employ a Chief Digital Officer. In the future, we will need different roles in the C-suite.

When CEOs have a virtual assistant with access to all of the company's performance data, a lot of these roles will no longer exist – or will need to change.

And the enterprise will need to be led by two groups: one focused on everyday management, and one focused on transformation. Because in this new world, you're going to end up having to do both. The rate of change will only continue to increase.

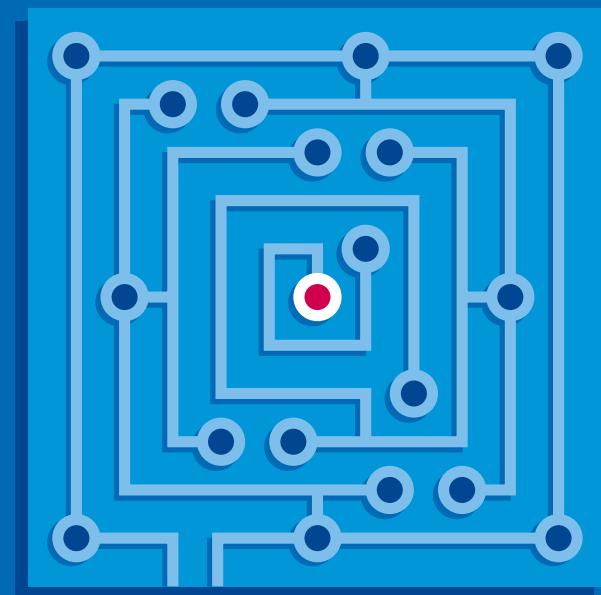
That's a challenge for boards, but also an exciting opportunity. DeepMind's narrow AI system AlphaGo, which since early 2016 has beaten the world's best Go players, devised new strategies to win that humans hadn't considered. But when paired cooperatively with AlphaGo, human grandmasters raised their own game to higher levels than ever before.

There's no reason why that won't happen with your business – provided you're thinking a few moves ahead.

Shamus Rae
Head of Digital Disruption
KPMG in the UK

Will AI help us navigate Brexit?

Brexit will inevitably affect the supply of skilled and unskilled labour into the UK, with knock-on effects for many enterprises. What is the potential for 'bots and AI systems to fill the gap, and how can companies use this challenge as an opportunity to kick-start their automation strategy? Karen Briggs, Head of Brexit at KPMG in the UK, weighs the evidence.



The potential for robots to steal our jobs has been a headline-grabbing story in recent years, and yet Britain in fact has a relatively low take-up of automation compared with other industrialised nations, and in particular our European neighbours.

For all the uncertainty around Brexit, one thing is becoming clear: the disruption to labour supply, while a cause for concern to many, could also be a catalyst for automation. According to the recent KPMG survey report, The Brexit Effect on EU Nationals, of the 2,000 EU citizens in Britain surveyed, only 8% said they are currently planning to leave. However 35% are considering leaving, which would equate to a million EU citizens in total.

A perception that British society has changed is the main reason people are thinking about leaving, or not coming in the first place. Younger, better-qualified and higher-paid people are more likely to be mulling an exit, raising the risk of a brain drain. Over half (52%) of those earning £50,000-£100,000 said they would leave or were thinking about it.

This could be the right moment to take a fresh look at workforce planning strategy and for the UK to leapfrog other nations in its application of AI technologies, improving productivity and cutting costs. Robotics, AI and automation may play a significant role in mitigating a Brexit effect on the UK's skilled workforce.

Despite British universities' strong global position in AI research, access to an open EU labour market has somewhat curbed the need for UK companies to invest in automation. This could explain why the UK lags behind its industrialised counterparts in the use of robots. According to the International Federation of Robotics, the UK uses 71 robots per 10,000 manufacturing employees, compared with 300 in Japan and Germany, and 500 in South Korea.

The race is on

Armed with this knowledge, we think Brexit can be a positive trigger for change. Employers will need to be far more proactive and imaginative in the way they attract and compete for talent. We are encouraging enterprises to use the opportunity to rethink their whole business, from strategy and organisational design to workforce and recruitment.

We are already seeing automation picking up in industries such as farming and hospitality, which rely heavily on overseas workers, particularly from the EU. Cognitive technologies are beginning to replace certain functions in financial services, too. Indeed, the Harvey Nash/KPMG Chief Information Officer (CIO) Survey 2017 shows that 34% of leaders are already investing or planning to invest in digital labour this year, while

62% of respondents from larger organisations are already investing in digital technologies.

We are encouraging organisations to plan staging posts. Some sectors, particularly those that rely on migrant labour, might have to accelerate their transition. But the process should be mapped out with a clear business-wide strategy and by applying new technologies in specific pilots that target certain processes, rather than an all-out investment.

It is not just about technology, either. Leaders must consider the cultural change that has to take place. CEOs are increasingly aware that they must understand the impact of the technological revolution in order to cascade the knowledge down to managers and other staff. Businesses have an opportunity to engage employees to help them better understand AI and robotics, but this must be led from the top.

The pace of technological change is unlikely to slow over the coming years, but the transition to greater automation is not a straightforward path. Many challenges lie ahead.

Steady, now

Cognitive technologies have the potential to transform the HR function by making it smaller, but with a bigger strategic impact. Forty four percent of respondents in our most recent HR Transformation Survey said that their spend on HR technology in 2017 is 'higher' or 'much higher' versus 2016, and the freeing up of staff to perform more strategic activities was cited as the No.1 reason for such investment.

One message that must be disseminated is that while technology may destroy certain jobs, businesses and even industries, it will also create entirely new ones – ones that we may not even have thought of yet.

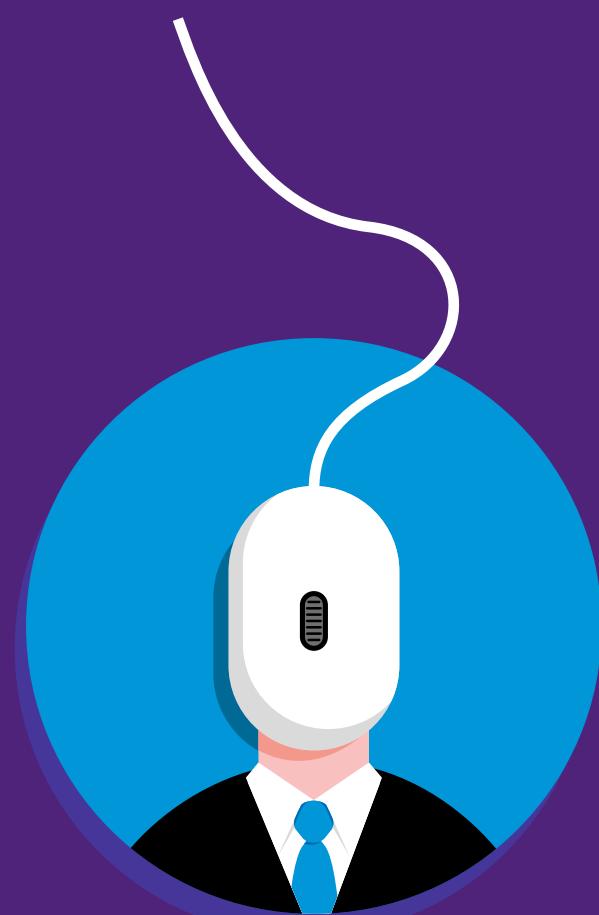
Despite recent technological leaps, it is still difficult to replace creativity and innovation. Instead of displacing humans, machine learning and cognitive platforms can enhance our skills and expertise. The challenge for leaders is to integrate human and digital labour side-by-side as they negotiate the challenges of Brexit.

Karen Briggs

Head of Brexit
KPMG in the UK

Bias in, bias out

AI systems are brilliant at analysing vast quantities of data and delivering solutions. But there's one major problem: they're bad at understanding how inherent biases in that data might affect their decisions. As a result, a series of headline-hitting cases are drawing attention to the 'white guy' problem, where systems make decisions that discriminate unfairly against certain groups. Ingrid Waterfield, director at KPMG in the UK, looks at how to get on top of the challenge.



In September 2016, an artificial intelligence think-tank ran the first ever beauty contest judged by an AI system. Thousands of photos were fed into a deep learning network, which judged the entries on facial symmetry, wrinkles and other categories. The results were not good.

Of 44 "winners", almost all were white. Only one had dark skin. The backlash against the experiment was – quite rightly – severe, with headlines calling the AI system racist.

It's not the first time newly developed AI systems have demonstrated serious bias, from voice recognition struggling with women's voices, to chatbots quickly learning and then using offensive, discriminatory language.

There's clearly a problem with bias. In that sense, AI mirrors the real world.

Society and business clearly haven't got their systems right at this stage – and therefore some of those biases already in data and systems are going to feed through into new cognitive systems.

This presents a huge challenge for companies as they seek to integrate these technologies. It's urgent, too, as according to KPMG's 2017 HR Transformation Survey, 29% of companies plan to integrate cognitive systems into their HR departments in the next year.

The tipping point's here

We know that we humans are likely to recruit other people in our own image. Many biases are unconscious and form at an early age. Prejudice is also difficult to root out within business processes.

For example, one organisation recently adopted blind CVs, and actually found that the change made no difference to diversity, because it was at the face-to-face interview that the unconscious bias came in. So businesses need to think about breaking down their ways of working, and saying: where are the points at which bias could come in? How can we do it in a different way? So then, as processes are automated, you're ensuring that discrimination isn't hard-wired in.

Does your data scrub up?

With AI, this is an issue of training sets. Take a recent example, of an advertising system that targeted ads for higher-paying executive jobs toward men. If your historical data is biased – and it most likely is – then using past benchmarks will lead to the same problems.

Data around a company's gender pay gap is an easy thing to look at. But around other questions, it is more complicated. For example, your internal figures might tell you that 2% of your workforce has a disability, but that may not be the case – there probably are more, but

employees don't want to disclose it. So companies need to work hard to ensure that these training sets are providing a true picture.

Collecting the right data is in part a question of trust. In the future, some companies will likely establish ethical codes to outline their use of such information. There are legal issues, too. Organisations that are more transparent, explaining what they're doing and why they're doing it, are less likely to face legal challenges.

There are steps that companies embracing cognitive systems can already take. Academics at Cornell University and elsewhere are working on new statistical methods to interrogate data sets for bias before they're introduced to a deep learning network. Teams adopting cognitive systems can institute a diversity workflow from the outset – to ensure that the issue of fairness is central from the start.

As ever, this is a question of leadership. Industries are not going to change overnight: bias is a societal issue. But I love the online video 'Redraw the Balance' where a primary school teacher asks the children to draw a doctor, a firefighter and a pilot. Almost all the kids draw them as men – and then the teacher brings in a woman pilot, doctor and firefighter. The kids are gobsmacked.

Right now, the AI is those children. It's being trained on biased stereotypes. If we expect unbiased machines, we humans have work to do in teaching them.

Ingrid Waterfield
Director
KPMG in the UK

Switch on cognitive, switch off discrimination

No matter how hard they try, people find it impossible to keep unconscious bias from affecting their decisions, leading to continued discrimination in employment and business practices. But for computers, it's a different matter. And this has enormous potential when it comes to the challenge of stamping out discrimination across your organisation. Robert Bolton, Partner, Global HR Centre of Excellence at KPMG in the UK, examines the potential for technology to help enterprises shake off discrimination.



We've all seen the headlines about AI systems producing racist or otherwise discriminatory outputs, but it's not the technology that is biased – it's the data that it relies on.

Cognitive systems are trained by historical data sets that are laced with our subjective judgements, so of course they inherit failings in the system. Now that we're aware of this tendency, we all need to be creating rigorous testing techniques and new standards to assess algorithms for bias – particularly with cognitive systems being used for applications as diverse as policing, banking and recruitment.

But AI also offers tremendous promise in helping humans to address their own unconscious biases. We've already seen that if a human doesn't get to see the name and gender on a resumé and just looks at achievements, they make different selections as a result.

Take Unilever, which has adopted a selection approach in which candidates perform in a series of games, and an algorithm assesses performance against a predetermined personality profile. That way, they're not asking someone whether they have the experience. Instead, the algorithm is assessing: does this person actually have those skills?

Is it time to automate the interview?

There are tech startups already working on using AI to do the initial job interview, and others working on facial recognition software to detect body language and emotion cues to help screen candidates. In the future, such AIs will make a judgement, based on a job description, about whether a candidate meets the required personality profile. If we can program systems like that – and rigorously test them to ensure the results are bias-free – then candidate shortlists are likely to be more objective and diverse as a result.

Of course, that presents a variety of challenges for the 60% of HR departments that are planning to adopt cognitive automation in the next five years, according to KPMG's 2017 HR Transformation Survey.

One of these challenges is identifying the kind of talent we want our AI assistant to find. Again, data can help. By looking at existing employee data, it's already possible to identify promising qualities in a job candidate; at KPMG, we now have an analytics capability which does that in near-enough real time.

The results of this approach can be fascinating. We were able to identify for a client predictors of upper quartile performance in a sales job nine months ahead, based on the first-month data of new starters.

The results were often unexpected and subtle: one thing that was predictive was how new starters chose to network – whom they sought advice from. In another role,

the indicators will vary. But it proves that if you can get at the information, you can identify some very interesting insights.

But there can be a flipside: there was a bank that did similar work around upper quartile performance. They crunched the numbers and worked out a set of six or seven factors that they felt had a causal relationship, and they recruited against this model. However, there was then a change in regulation around the range of products that this part of the bank sold. And it was only after reassessing the model that they realised the regulation change had changed the indicators of performance.

Therein lies a lesson: the tendency of early cognitive systems will be to steer companies towards a monoculture. AI systems need to be rigorously assessed and retrained in order to ensure that the algorithm is up to date.

Diversity = innovation

Monocultures are anathema to innovation. Innovation comes from the boundaries of things: the interplay between domains of knowledge, of different cultures and mindsets. It's one department seeking to collaborate with another, with unexpected results. Many recent reports suggest that organisations with more diverse boards perform better in the long term for exactly this reason.

Companies introducing AI systems will need to think hard not just about what automation means for efficiency, but what it means for their company culture and values.

The companies leading this field are creating automation 'centres of excellence' that can build-out best practice. That's something that should continue; as AI develops, we're going to need rigorous assessment and reassessment of algorithms.

So, while AI certainly introduces new challenges when it comes to diversity, there are tremendous opportunities. The implementation of cognitive automation is not just a technological question: it's a cultural one.

Before you start transforming your company, ask yourself: 'How do we want to use automation for the benefit of customers, employees and even for society? What kind of company do we want to be?'

Robert Bolton

Partner, Global HR Centre of Excellence
KPMG in the UK

Tinker or transform? You'll need both to harness AI

AI's promise goes way beyond saving resource here or augmenting capability there. Instead, this is transformative technology that can re-shape your enterprise for the better – and without a proper strategy, that opportunity will be squandered. Shamus Rae, Head of Digital Disruption at KPMG in the UK, outlines how to capitalise.



The UK, which is a global centre of excellence in AI technology, is now at a tipping point.

Sectors such as investment banking and professional services have been piloting these systems for some time and so are starting to understand their true potential. As a result, companies are now in the process of planning implementation projects, which will see adoption levels jump dramatically over the next two years.

In fact, according to the Harvey Nash/KPMG Chief Information Officer (CIO) Survey 2017, just over a third of CIOs are either investing or planning to invest in digital labour this year, while the figure leaps to two thirds among CIOs in large companies. The main drivers are improving quality (27%) and boosting efficiency (24%).

Try before you buy

But although this market maturation is undoubtedly positive, it is also important to sound a note of caution. Vendors are currently doing a lot of overselling about the breadth and depth of AI's potential capabilities. As a result, it is vital to keep on testing the technology to understand which promises are real, and which are overhyped.

Another important issue is that not all AI systems are the same. Each is different in the way they learn and what their strengths and weaknesses are, so it is vital to ensure you employ the right technology in the right context.

Once you understand what does and does not work, bring in a technology-agnostic advisor to help you establish where the possible opportunities for AI are in the business. Ask yourself difficult questions about whether these proposed uses for AI are likely to transform your business model and, if so, what the repercussions will be.

But due to the strategic nature of the potential change, always ensure you obtain buy-in at the highest level, too. It is essential to educate the C-suite, and the management layer below, about the benefits the technology can bring and exactly what it can and cannot do, to ensure that expectations will be met.

It is also worth bearing in mind that, because AI systems learn as they go along, they can take time to build into an effective tool. Therefore, it is crucial to have a good understanding of the ways in which automation can help your business, as this will form the basis of your strategic roadmap for the technology.

But the importance of having a suitable governance structure in place should also not be underestimated. The challenge here is that most organisations' data is not very clean and is subject to unconscious bias that could disadvantage certain groups and damage diversity.

Another key consideration is that, once AI has been deployed effectively, it will inevitably pivot your business model. This means the company will need to undergo corresponding internal change.

Tinker and transform

There are two ways of introducing this change: I call them 'tinker' and 'transform'. And to make a success of this technology, you need to run both concurrently.

To truly pivot your business, it is almost necessary to start an arms race with competitors over how to deploy AI most productively. But the issue for organisations that have been around for a while is that they tend to be somewhat risk-averse.

So I suggest creating two separate work streams. The first approach involves starting a 'tinker' project that aims to change the business gradually from within by experimenting around the core.

The second method entails transforming the company by introducing disruptive projects that run in parallel to that core business. Such initiatives might involve investing in interesting startups or developing new products and services internally, but they contain the seed that will potentially grow into the business of the future.

The secret to success is experimenting in a controlled way, at zero risk to the business. It is not about automating things as they are now, but about trying to understand how they will look tomorrow, using transformative technology to shape your future for the better.

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