The Enterprise AI Promise:
Path to Value

sas

1: Executive Summary

This interview survey explores enterprise readiness for artificial intelligence (AI). Respondents came from across EMEA and from a number of industries and sectors. Their views on AI and their organisations' levels of readiness were diverse.

A feeling of optimism

Findings suggest that the vast majority of organisations have begun to talk about AI, and a few have begun to implement suitable projects. Optimism about the potential of AI was high, although fewer felt optimistic that their organisation was ready to exploit that potential. This suggests that there may be problems with execution, and that delivering on the promise of AI could take longer than expected.

Most respondents were aware of and enthusiastic about well-known uses of AI, such as Amazon's Alexa, and Apple's Siri. Few, however, could cite own-industry examples, or suggest any of their competitors who were actively engaged in developing AI, even though around two thirds felt certain that AI would have wide-ranging effects within the next 5 to 10 years.

Organisational issues

There were some big differences in levels of practical organisational readiness, in terms of the data science expertise and suitable platforms. Most organisations had given some thought to the problem. Those who had already started work on AI often had in-house teams and platforms in place, or arrangements to source them. Those who had not yet started, but felt that exploiting AI was essential, suggested that they were most likely to opt for cloud-based solutions and/or consultancy support. Both these offered flexibility and scalability that would be important when starting out.

Many organisations were still experimenting with processes to approve AI projects. The most popular option was a central data science team, although business units were also involved in many organisations. The evidence required for decision-making was also variable, with some saying that AI investments were the same as any others, and others suggesting that there was a general recognition that it was hard to quantify benefits and experimentation with low-cost options was encouraged.

Challenges and concerns

By far the most detailed responses were about the challenges faced by organisations and society through the introduction of AI. Perhaps it is human nature to see barriers rather than opportunities, but it is also clear that there is a high level of worry about this.

The most commonly-mentioned societal issue was jobs. This included both loss of jobs, and new jobs that would emerge as a result of AI, and would need new skills. Although there were few clear views about the precise changes that were likely to result, there was a lot of concern about how the changes would be handled.

Hot on the heels of jobs came ethical concerns, many of which were linked to job losses and changes. Questions included: what would happen to those who lost their jobs? How would regulatory and other systems need to change? How would the lag between the introduction of new technology and the necessary changes be handled? These are all big questions, and suggest that there is both a need and an appetite for some difficult conversations around the ethics and practical implications of introducing AI.

On an organisational level, many respondents felt that developing trust in AI was the biggest challenge to its uptake. This trust needed to develop both internally and externally, in customer organisations. Respondents discussed the importance of data scientists understanding business issues to improve relationships, and executives being prepared to trust decisions from algorithms, as key to broad uptake of AI. These developments might require cultural change, and would therefore take time. This recognition may explain why respondents were more optimistic about the potential of AI than their organisation's readiness to exploit it.

An appetite for discussion

The state of enterprise readiness for AI varied widely among our survey respondents. What was clear, however, was that the vast majority of those surveyed were discussing the issues within their organisations. Understanding of the detail was vague, and there were few own-industry use cases, but all felt certain that change was on its way, and soon.

There was also plenty of appetite for discussing the likely 'big issues' and how to manage them, particularly ethical concerns. This suggests that organisations are treading carefully, mindful of the dangers as well as the potential of AI. That bodes well for the future despite the anxieties expressed, and it looks like there are grounds for cautious optimism.

2: Introduction

Artificial intelligence (AI) is currently a hot topic. Inspiring and practical use cases are emerging on a daily basis. But it will not achieve mainstream traction unless organisations plan for its adoption.

This study examines Enterprise Readiness for AI, through interviews with representatives from businesses across EMEA and from a wide range of industry sectors.

This report is structured around four areas:

Organisation-specific challenges & opportunities

Work with early adopters suggests that organisation-specific opportunities and challenges will loom large. This section explores the current state of play for AI in organisations, including the extent of its use, and the challenges and drivers involved.

Platform readiness

This section covers practical issues for the implementation of AI, including both people and platforms, to see whether organisations have the necessary skills and tools in place. This section covers the role and skills of data scientists, and views on the right technology.

Sentiment about AI

The third area concerns whether organisations feel optimistic about AI. Enthusiasm is an important, and often underrated, element of any change project. Optimism about AI therefore gives a picture of the likely success of its introduction.

Scope of practical AI

How organisations define the scope of AI for their business will dictate the level and speed of investment. Much of this will be influenced by education about how AI will affect society as a whole, and over what timeframe, and this section explores these questions.

These areas were chosen to show variety across sectors and organisations, and to identify the main challenges and opportunities for organisations. Perhaps more importantly, we wanted to understand what still needs to be done. By providing the 'big picture' on AI adoption, we hope to contribute to the debate, and help organisations get the most out of the technology.

Confused about AI? You are not alone. We have compiled a primer that tells you what it is and why it matters by walking through the history, where it is today, how it's used and how it works.

3: Organisation-specific opportunities & challenges

Current status of AI in organisations

Respondents confirmed our views that it is still very early days for AI. Good use cases are rare, and there are plenty of challenges facing early adopters.

Most of our respondents had taken at least a few tentative steps down the road towards use of AI, but these were often pilots or proofs-of-concept, rather than anything more substantial. Projects mentioned included building general analytics capacity, setting up dedicated units, and very specific pilots, such as self-driving trucks.

> "Currently, we are implementing a wide range of use cases that contain AI modules."

Most of the investments and initiatives were also at an early stage. Several were still in the planning stage, and even those that were underway had yet to provide any benefits. A very few respondents were open in admitting that they did not have any plans to use AI at present, but most of these were still keeping a watching brief on the issue.

Most respondents were able to discuss specific investments and initiatives that their organisation hoped would be worthwhile. Only a few, however, could mention more than one or two, or demonstrated an organisation-wide approach. Some discussed the strategic importance of particular projects, but there was a general sense that AI was not a core part of the organisation's strategy yet.

> We are devising a roadmap with the organization's strategic guidelines about AI.

A few organisations have embraced AI wholeheartedly, and made it a key part of their organisational strategy for the next few years. Business cases were driven by the need to provide growth potential, keep up with the competition, or provide cost savings through efficiency. These early and enthusiastic adopters hope that they will see rapid benefits; their competitors hope to learn from their mistakes.

Drivers

Where growth is the key driver, the emphasis of advanced analytics and eventually machine learning is towards delivering superior customer experience. Your organisation needs to match or exceed the best experiences your customers have had with other organisations online or in self-serve environments.

Learn more about why real-time customer experience is about small decisions

What (topic) drives on your business case?

Source: The Enterprise AI Promise Study. August 2017. N =100, multiple responses allowed.

> Each branch has embedded Data Science functions that can develop opportunities, they also have some capabilities to "experiment". All demands are "federated" and documented to Corporate Digital Team. Central drivers are the Corporate Digital Team and R&D they "negotiate" with IT.
>
> **Michel Lutz,Group Data Officer, Total**

Source: The Enterprise AI Promise Study. August 2017. N =100

AI drivers and stakeholders

Having a central data science team was the most popular form of sponsorship for AI projects, although in some organisations, individual business units were driving their own initiatives.

> We have a special unit to integrate big data [and] analytics in our business processes.

There were two broad options for the central team: either that team was driving adoption, or business units were suggesting ideas, and these had to be approved by the central team, which acted as business sponsor. A few organisations were using a hybrid model, with ideas able to be put forward by either the central team or the business units, allowing more flexibility. Some respondents recognised that the current position was likely to change in future.

> More departmentally driven at present. I would like it to become more centralised.

Several organisations mentioned a senior-level sponsor for AI and advanced analytics. In some cases, this was a member of the c-suite, and in a few, the CEO. In others, it was a more junior director, usually one with an interest in the area. One respondent mentioned that the organisation planned to appoint a Chief Data Officer within the next six months, who would take on responsibility for this area.

Defining the AI business case

Business cases are a good way to see whether a new initiative is considered 'more of the same' or not. If it is 'more of the same', then the same systems and requirements will be applied as to other projects. Interestingly, responses to our survey suggest that AI and advanced analytics are seen as rather different from other initiatives in at least some organisations.

Some respondents, usually those in organisations that had not seriously started working with AI, did not have an answer. The practicalities of deciding where to invest have not yet been worked out even if there were projects in the pipeline.

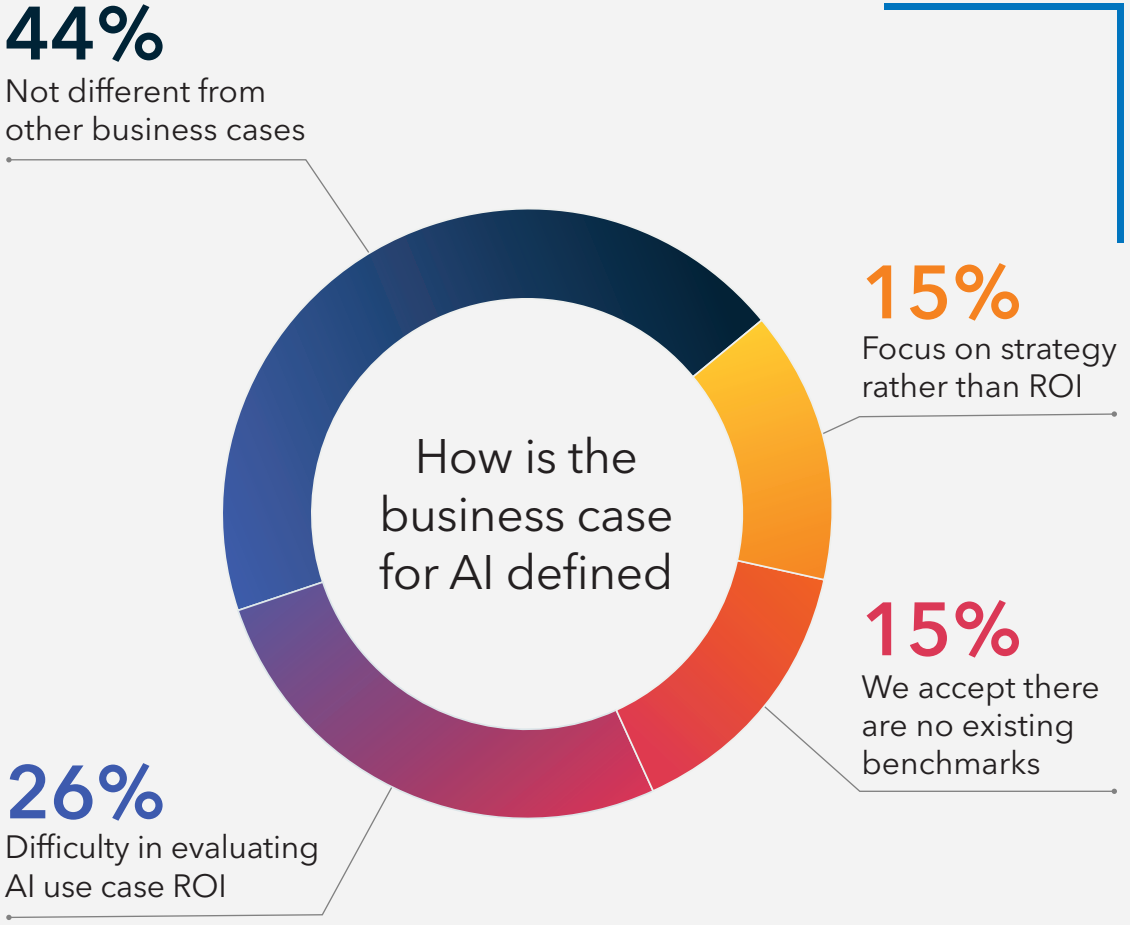
In some organisations, AI and advanced analytics projects were approved based on rough estimates. In some cases, those responsible for approval recognised that it was difficult to determine return on investment, and organisational members were therefore encouraged to experiment, or to test low-cost options first.

> "There are still too few benchmarks to evaluate [ROI] correctly."

Other organisations, however, had taken a more traditional approach, and were trying to quantify the likely benefits of AI projects. Some said that AI projects were assessed in exactly the same way as any other initiatives. A few respondents commented that AI projects needed to be designed to solve a business problem, with several saying that projects were generally designed to reduce costs or optimise delivery in some way. One mentioned the importance of strategic fit, and another of keeping up with the competition.

AI is not, of itself, beneficial, so making a business case is important. It is always easy to adopt new technology because it is available, or because others are doing so, and this might be particularly true in organisations worrying about keeping up with the competition.

> "Projects based on AI are verified in the same way as traditional initiatives."



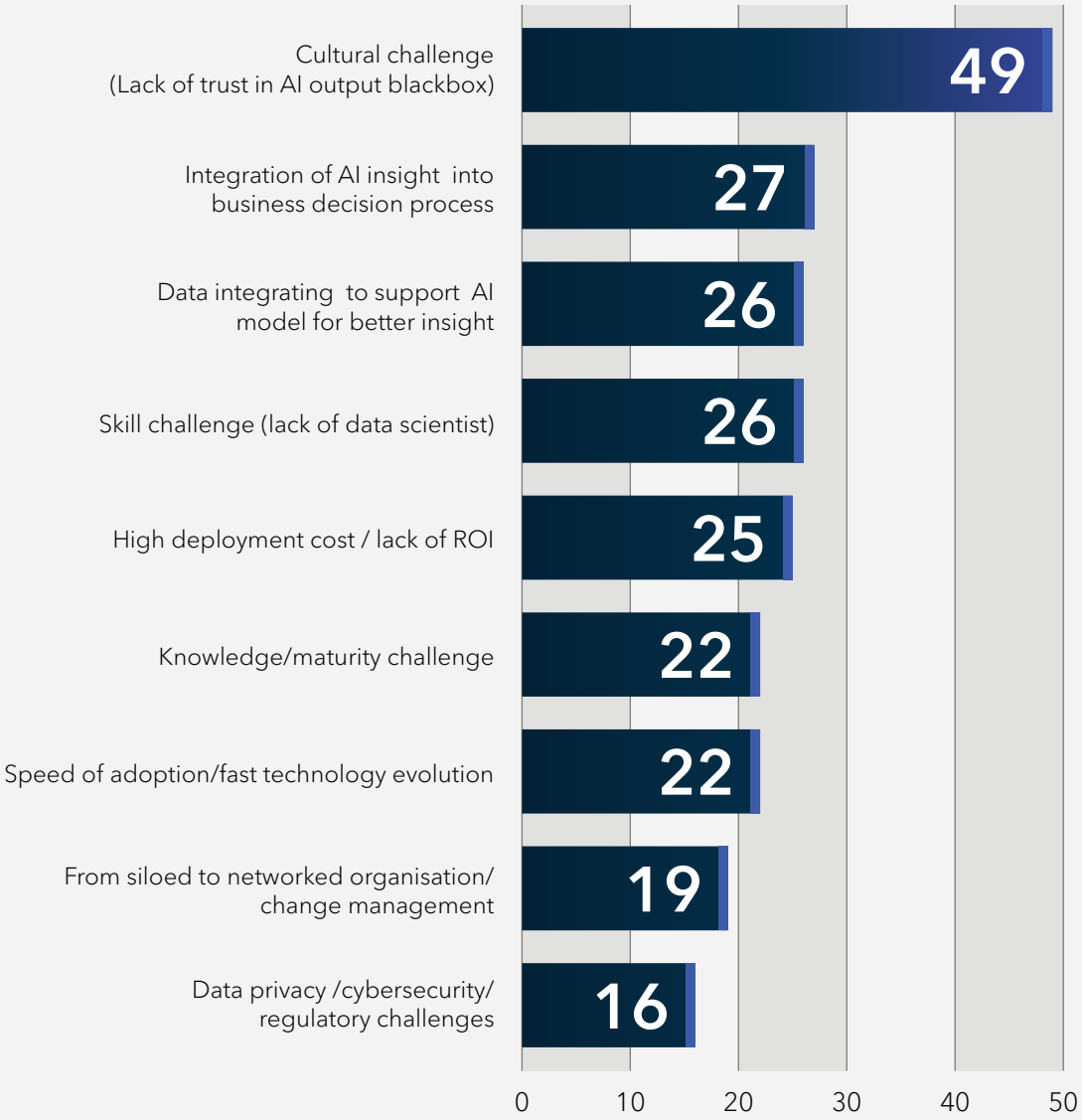
Source: The Enterprise AI Promise Study. August 2017. N =100

Building the business case

The pursuit of the 'golden use case' has arguably held back many organisations from fully exploiting analytics. There is danger that we will see a replay of this in the machine learning stakes. Waiting for your competitors to raise the bar is not a sustainable model.

Respond to the wake up call and consider a lab environment to test radical ideas and supporting cultures

What are you experiencing, or do you expect, to be the biggest challenges with deployment of AI in your organisation?



Source: The Enterprise AI Promise Study. August 2017. N =100, multiple responses allowed.

Organisational challenges

Views on the challenges of implementing new technology tend to affect the approach adopted. If the barriers are perceived as too great, organisations will often decide not to bother until they see that the benefits outweigh the problems. Hearing about others' concrete experience of the challenges, however, can often help second-stage adopters to get over the first hurdle and actually get started.

Trust emerged as a major challenge in many organisations. A number of respondents mentioned the importance of getting those within the organisation to trust and use the results of advanced analytics. In some cases, this meant changing ways of working, perhaps to move to a more networked approach, which in turn required cultural change.

> "You're not looking for THE data scientist. You're looking for a collection of talented individuals who can collect data, analyze it, interpret the results and recommend actions. Call them data scientists if you want. These people should be able to support a variety of big data initiatives. One size does not fit all."
>
> **Tamara Dull,**
> **Data Science Thought Leader & Director of Emerging Technologies at SAS[1]**

Trust is not just an internal issue. Several respondents noted that customer attitudes would also need to change. Customers would need to be willing to rely on AI, or their suppliers could not adopt it. Developing this trust could be a long-term issue, starting by building personal relationships, and therefore trust, between data scientists and business units, and then extending to customers.

Data integration to support AI was also identified as a major issue, the second most crucial. This chimes with our experience: over and over again, we have seen that data management, and bringing together data from multiple sources, is crucial to getting value from investment in advanced analytics.

Skills shortages was the third most important challenge identified. Some respondents said that their organisation would probably hire consultants rather than try to develop in-house expertise, perhaps recognising that shortages of data science skills might make the latter impossible.

[1] https://www.linkedin.com/pulse/stop-looking-unicorns-building-your-big-data-team-tamara-dull

4: Platform readiness

Adoption of AI relies on practical readiness. This means having the tools and skilled staff in place to be able to exploit the technology effectively. We wanted to know about two areas in particular: data science skills within the organisation and the availability of suitable platforms for analysis, as these give a very effective picture of the organisation's approach to AI.

Data science team readiness

We wanted to understand whether organisations felt ready for the challenges they faced. Our aim was to find out if data scientists felt ready, and also to assess how the organisation viewed its data science team. We were interested in what development was already under way and how organisations planned to recruit and/or obtain data scientist skills in future.

The responses were quite revealing. A very small minority felt that they and their teams were absolutely ready. They were on top of their game, and ready to go, keeping up to date with developments in their industry. Some organisations had a data science team, but recognised that they still might not have the necessary skills in-house. This would need to be tested, and the necessary skills developed.

Teams were actively developing their skills through attendance at workshops and conferences, as well as studying and keeping up to date with developments in the field. One particular area for development was the issue of business knowledge. Respondents commented that data scientists needed to improve their knowledge of the business to contribute fully to AI deployments, and that there was perhaps a new or future role for data scientists in bridging analytics/IT and business. Other responses noted the importance of expanding data science capacity to manage AI. Even if they already had data science teams, they wanted to recruit more data scientists, recognising that there would be additional need for data science in future.

> "We are at a turning moment here. Data scientists are not easy to hire and even more difficult to keep."

How are you preparing your data science team to handle these requirements?

Source: The Enterprise AI Promise Study. August 2017. N =100, multiple responses allowed.

Over one fifth of respondents were considering plans to recruit consultants or draw on partner organisations to fill the gap, citing for example the additional flexibility of working this way. This may be linked to the rising use of cloud platforms for AI.

> We don't really have a need for a big data science team…. [We are] more likely to rely on third parties with specialist skills in niche tools.

Data scientist readiness

The potential impact of APIs in analytics is huge. From gathering data from new sources, through modelling and getting the results out to consumers, to evaluation, they can be beneficial to various steps across the whole analytical lifecycle.

Understand how this, in turn, is changing the role of data scientists, including citizen data scientists

Platform readiness

This question again assessed readiness for AI, this time in terms of the infrastructure required. There was a wide gulf between those who were already doing this, or ready to do so, and those who felt that they were at a very early stage. Only a very small minority felt that everything was in place, and they were managing well.

> "Yes, we are ready; everything is available and built for AI from scratch."

The largest group was those with no specific platform in place. Some respondents noted that as yet, they had no need for this type of platform, so had not made any decisions about what might be required. The second largest group, however, and over one fifth of the organisations, were those envisaging a cloud-based storage system or approach.

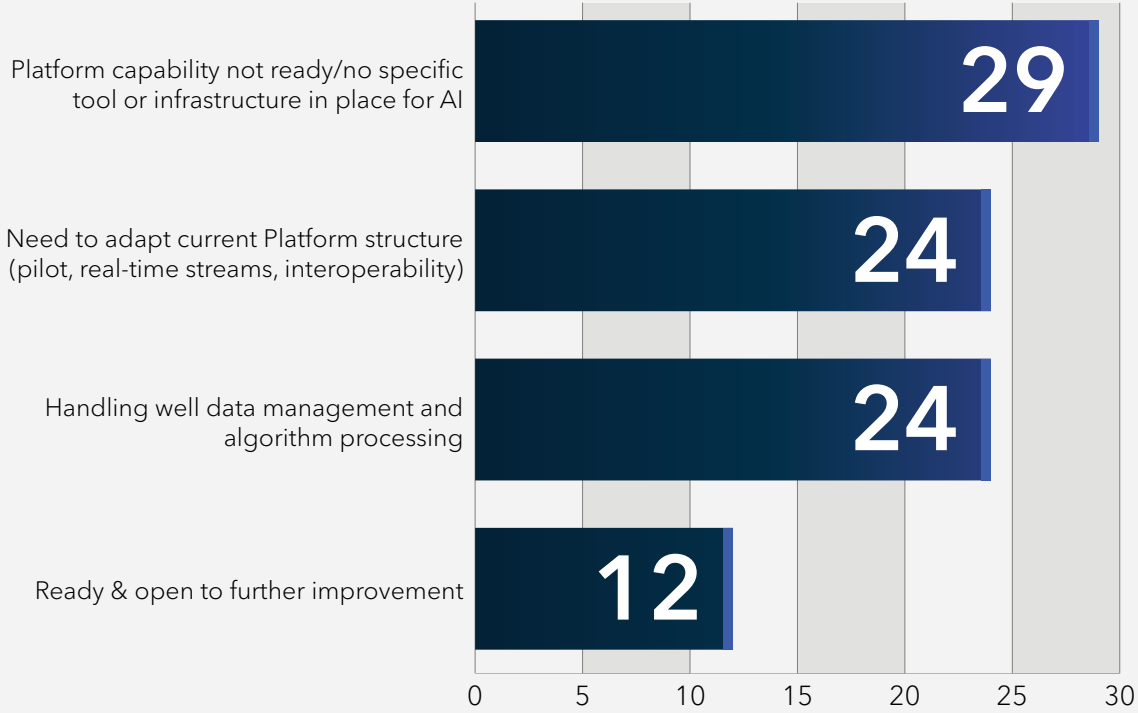
> "Cloud is necessary….this type of multi-scalable architecture is necessary for AI adoption."

Some organisations had already made specific investments in platforms designed to handle data from AI deployments. These were often in the cloud. Others were using partners' infrastructure. A few, mostly financial organisations, were avoiding cloud for now, but recognised that it might be necessary for the future. Especially if real-time analytics became necessary, and one or two mentioned a hybrid cloud–in-house strategy.

Organisations planning for cloud solutions often cited the increased flexibility and scalability that this offered. This had echoes with the planned use of consultants to supplement data science skills.

> "We think that cloud technology … is mandatory for its flexibility & speed"

How ready is your platform capability to handle expected data management and algorithm processing?



Source: The Enterprise AI Promise Study. August 2017. N =100

Platform readiness

Creating an architecture to support AI is about creating a modern platform for advanced analytics, and means being able to support all steps of the analytics lifecycle. Alongside the technical capabilities, it is also important to support the process around the analytics.

This guide can help you assess your platform's readiness

> The problem is getting things off the ground in the shorter term, and looking to those companies with the budgets to do the necessary R&D. There is still a lack of infrastructure for putting AI in place, so in this sense I'm more 2 or 3 out of 10. There is still a lack of big data adoption, so proper AI is still a way off for many.
>
> **Yves Mulkers, Influencer/Expert in the Field of Big Data Analytics, IoT, AI[2]**

5: Comparison of sentiment

Levels of optimism about AI were generally high. The average level of optimism about the promise of AI was highest, on 7.5 out of 10. However, levels of optimism fell when asked about the potential of AI for the organisation, and optimism about organisational readiness to exploit AI was lower still, at just 6 out of 10. Given that most people tend to exaggerate their own and their organisation's abilities, this is worrying.

> The organization is highly optimistic as regards AI. New ideas for using it pop up regularly.

It means that professionals responsible for driving the use of learning algorithms in their organisations are most optimistic about the promise of AI, and least about their organisational readiness.

Link this to the expectation of speed, and we can see that there is likely to be a massive execution problem.

There may be a silver lining in the cloud. Remarkably few organisations felt really optimistic about their readiness, suggesting that there are likely to be very few early movers. AI may have huge potential, but very few are yet ready to exploit it, and the laggards may not suffer too heavily.

[2] https://twitter.com/YvesMulkers

Understanding of AI and its implications

How people define things affects the way that they view and respond to them. How organisations view and define the scope of artificial intelligence (AI) for their business will therefore dictate their level and speed of investment. Views are also likely to be determined by whether organisations can see AI being used in their industry or more widely.

Survey respondents' opinions and views about AI showed some common patterns. Most were able to produce a broad definition of AI and advanced analytics, with many mentioning support for decision-making. Fewer than half, however, articulated a nuanced understanding of AI.

> "It is the simulation of human thought processes in a computerized model, involving self-learning systems that use data mining, pattern recognition and natural language processing to mimic the way the human brain works."

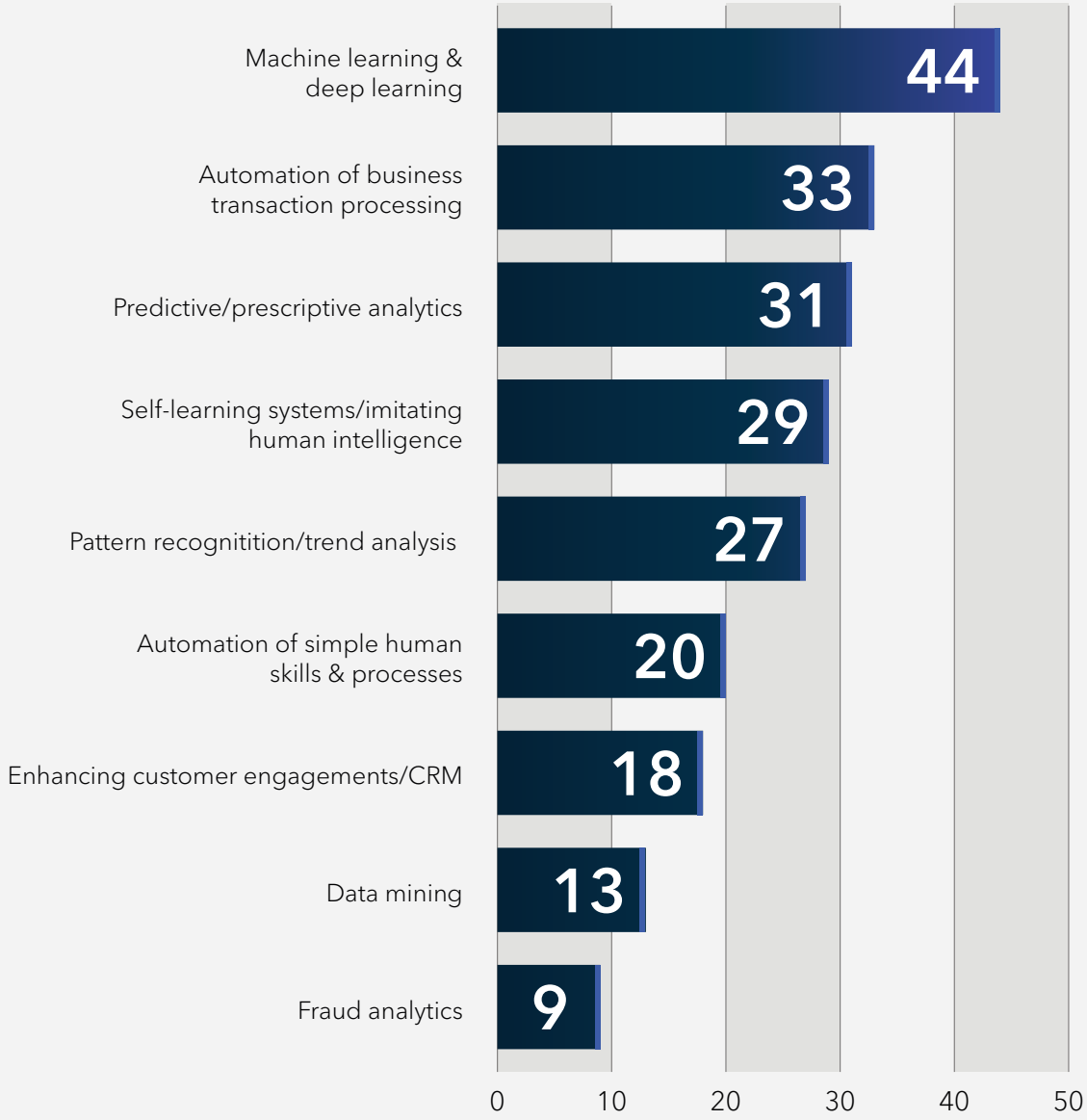
The more sophisticated responses discussed whether there were differences between cognitive computing, machine learning and AI, and also recognised that analytics did not necessarily draw on any or all of these. A number of respondents also commented that these developments were evolutionary, not revolutionary, with their origins lying in familiar technology.

> "Artificial intelligence cannot do without advanced analytical tools"

Most of our respondents were clearly aware of the potential of advanced analytics linked to AI. There was a general recognition that machine learning was already being widely used to power recommendation engines and respond to consumer demand, and several respondents discussed Amazon's Alexa or Apple's Siri as examples, along with connected homes and self-driving cars. Many, however, had no own-industry examples to offer, or the own-industry examples were very general, such as predictive maintenance or fraud prevention.

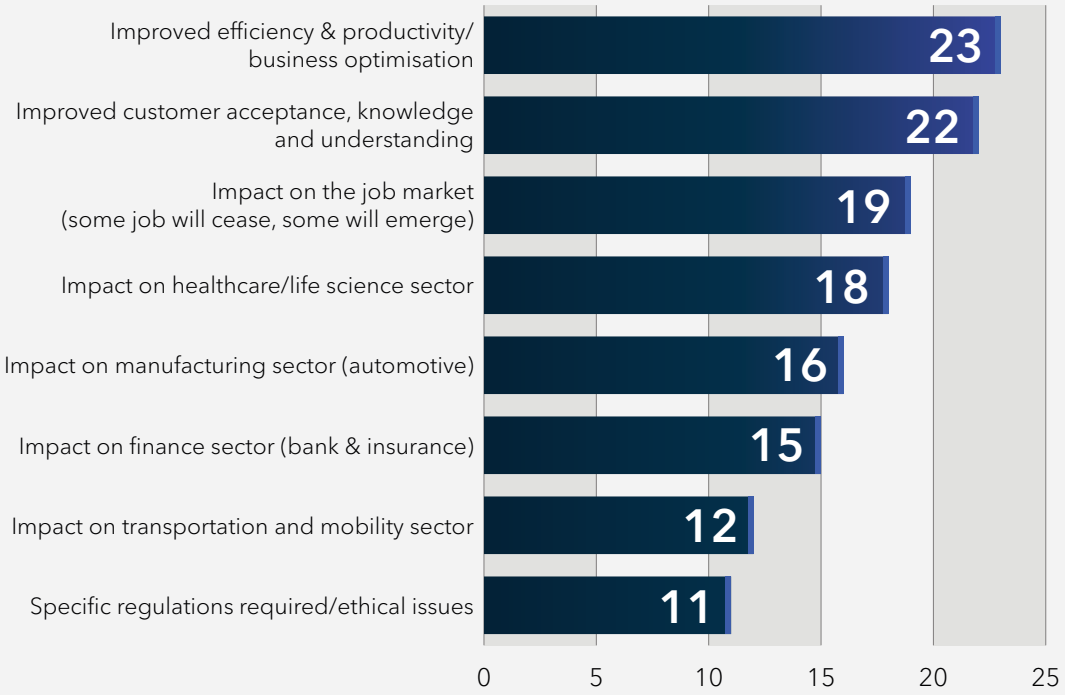
A cross-tabulation of the more sophisticated respondents against the rest for the remaining questions found no discernible differences in other responses. This suggests that understanding does not necessarily drive action.

What do you understand with the term analytics and its most recent successors like machine learning, cognitive computing or artificial intelligence?



Source: The Enterprise AI Promise Study. August 2017. N =100, multiple responses allowed.

When you take society as a whole: do you think AI will change the way we live and work?



Source: The Enterprise AI Promise Study. August 2017. N =100, multiple responses allowed.

Concerns about jobs

The human-machine partnership is already here. Many of us now use voice-activated personal assistants to perform simple digital tasks. The digital revolution requires an ever-increasing number of repetitive and targeted decisions, and the best way to manage these is through machine-learning algorithms.

Learn more about the unfolding augmented knowledge' that paves the way for higher performance humans

6: Expected impact on society

This question was designed to assess respondents' sense of the potential of AI. There is an important difference between a rather casual response of 'Oh, it will be massive', and a more nuanced and considered discussion of how exactly AI might affect things.

Respondents were often very speculative in their answers. Ideas for early successes were generally fairly predictable and specific examples such as self-driving cars, or very broad-brush, such as the view that this or that sector might be ripe for disruption. There were more industry-specific responses than societal ones.

The issue that came up most often was the effect of AI on jobs, including both job losses and the development of new jobs requiring new skills. This is perhaps unsurprising, given that this has been the focus of most press coverage and commentary on AI.

> We anticipate that many jobs currently performed by humans will be substantially taken over by robots or digital agents in the near future. Automation and robotics will definitely impact lower-skilled people.

Some financial services and banking respondents discussed the likely development path of AI applications. One noted that AI was moving from single-task applications through 'human-like' tasks to 'more-than-human'. Others noted that AI was not new; current machine learning and AI developments build on technology that has been around for some time. Several respondents observed that speed of development would largely depend on consumer uptake and acceptance. One respondent observed that the real disruptors could come from anywhere, and might be as-yet-unforeseen, because they would depend on consumer responses.

The 'missing' issue was any discussion of human–algorithm partnership. This seems strange since that is a fundamental piece, vital in moving to AI-driven call centres and the like. This suggests that many respondents had not considered these issues in any detail, even though more than two thirds thought that the changes would happen in the next 10 years.

> The evolution to more AI has started and cannot be stopped, it is accelerating.

Expected timeframe for AI to be part of everyday life

We wanted to know our respondents' views on how soon AI would have an impact on everyday life. This gives some idea of how seriously they think that AI developments should be taken, and whether the conversations need to happen now or later. The responses were telling.

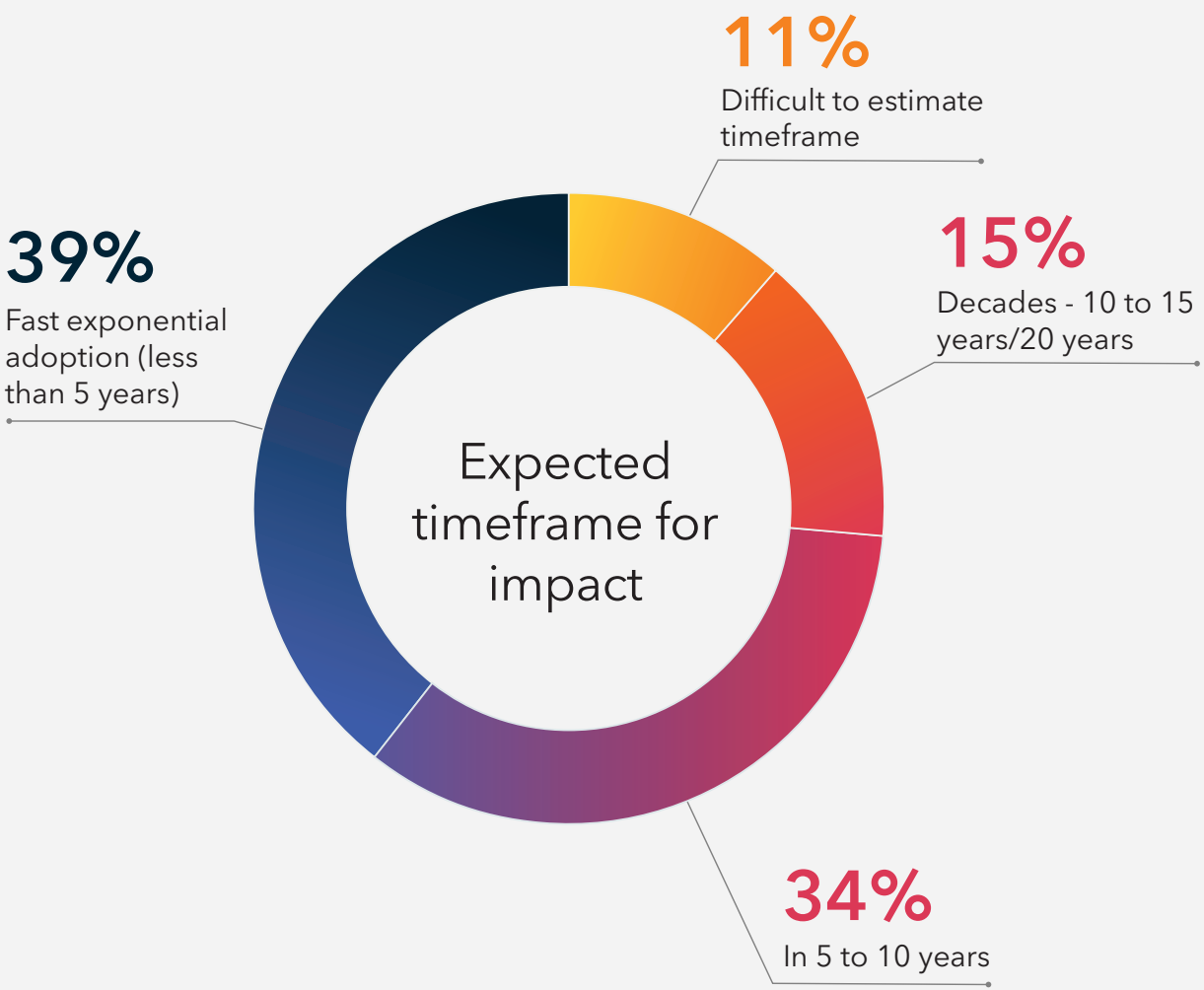
Around one fifth said that it was difficult to estimate a time frame, and slightly more said that they thought changes were decades away. These respondents were therefore likely to see little urgency in the situation, and have much less appetite for practical conversations about platforms or capacity, although they may be interested in longer-term, more theoretical discussions about ethics.

Around one third of respondents, however, thought that adoption would be fast, if not exponential: within the next five years. A further third or so thought that it would be within 10 years. For these respondents, early and focused discussions are clearly likely to be important. They will want to know what is happening and how they can be a part of it, and their own capacity and readiness will be crucial.

> "AI, once it reaches the right level of maturity, and once the appetite for adopting it gathers momentum (we are very close to reaching that point) will change society…like the industrial revolution."

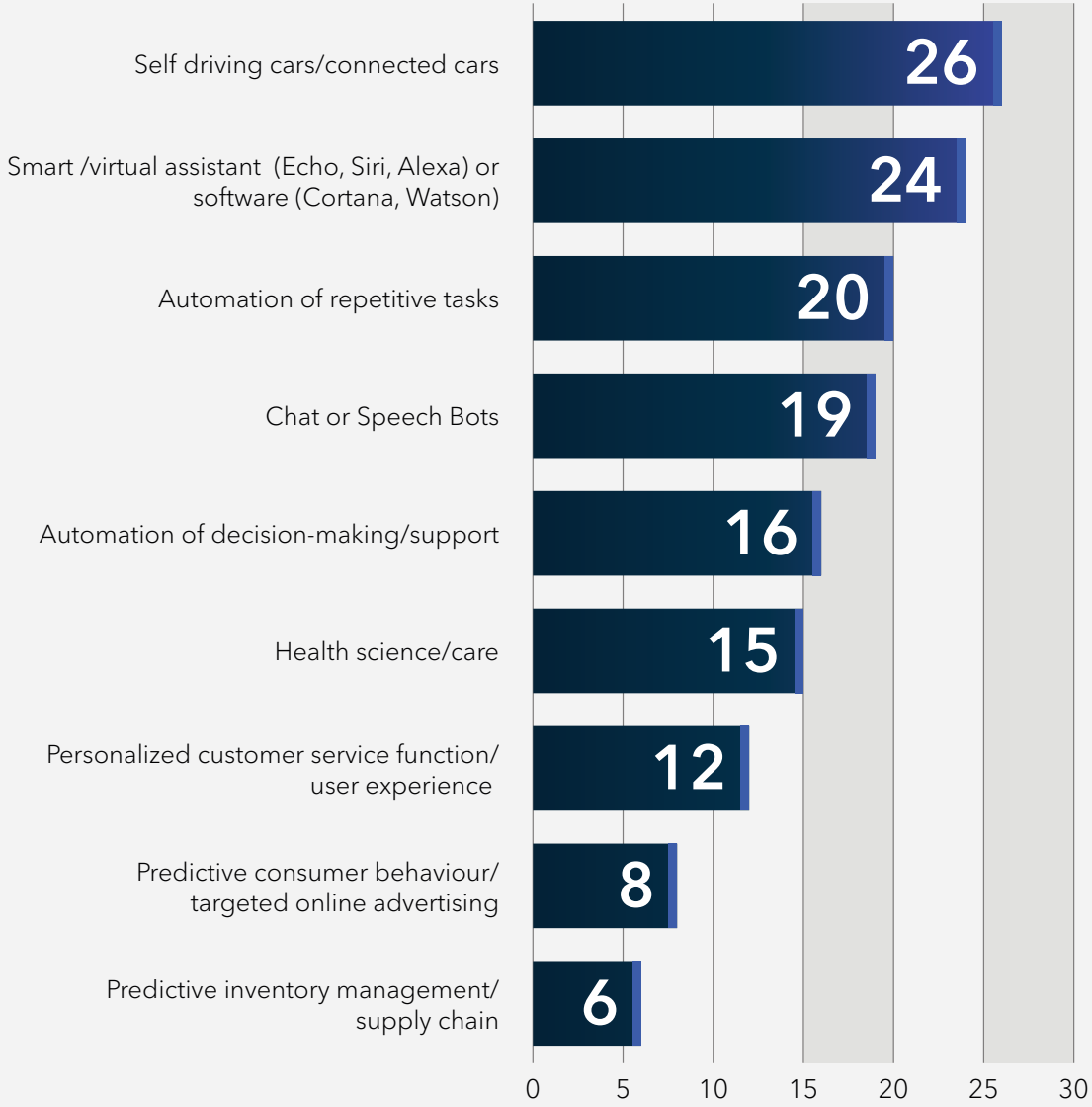
[3] https://twitter.com/MikeQuindazzi

> "Over the coming years, ongoing advances in AI will have profound impacts on jobs, skills and HR strategies in virtually every industry—underlining the fact that companies don't have the luxury of time as they map out their plans for an AI-enabled world."
>
> **Mike Quindazzi, Managing Director, PwC[3]**



Source: The Enterprise AI Promise Study. August 2017. N =100

Do you see any natural areas for early results?



Source: The Enterprise AI Promise Study. August 2017. N =100, multiple responses allowed.

Natural areas for results

Asking whether respondents saw any natural areas for early results gives us an idea of the current state of genuine knowledge about AI. Own-industry examples would show that AI is widespread; more general replies, or those largely drawn from media reports, by contrast, would tell us that practical application is further away.

The most commonly-known examples were self-driving cars or connected cars, followed by smart virtual assistants like Siri or Alexa. These were both cited by around a quarter of respondents. Others mentioned the automation of repetitive tasks, and chatbots. All of these examples suggest that knowledge of AI remains very media-driven.

> "Pseudo-AI is already a large part of our everyday lives with notable examples being self-driven cars, intelligent assistant software (Cortana, Watson, etc.) and the use of robots in the production processes and assembly line. In the banking sector for instance, AI would be particularly useful in handling streams of data in real-time, facial recognition, intelligent assistant in customer support, fraud detection and more."
>
> **Stelios Mantas,**
> **Customer Analytics & CRM Manager,**
> **National Bank of Greece**

All these examples or applications have been widely reported in the mainstream press over the last year or so. However, only a few respondents mentioned the actual feasibility of these applications, perhaps because this has not featured widely in media reports. Those that did noted the societal implications.

> "Question is, will society catch up fast enough to cope with the complex technologies such as driverless cars – it's not just about the car, it's the infrastructure and associated costs."

Answers were an interesting mix of the very specific–such as self-driving cars, rather than the broader category of 'transport'–and the very broad–such as 'automation of repetitive tasks. Some focused on sectors, such as healthcare, and others on the type of task that might be affected. Overall, the answers suggest that knowledge of AI is still very basic, and practical applications are not widespread.

Challenges associated with AI

Views on challenges and difficulties tell us a great deal about general awareness of and likely acceptance of technology and change. Big, general fears suggest that awareness is low, but when fears start to become more specific, they coalesce around particular problems that can then be addressed in product design. This question therefore gives information about the level of maturity of thinking and awareness.

The responses to this question were probably the most detailed, suggesting that people are worried, but in a fairly broad-brush way. The issue mentioned most often was the changing scope of jobs, which chimes neatly with the responses to the previous question. Third most popular, and linked, was the idea that new jobs would develop requiring new skills. The general feeling was that AI would affect jobs, but it was hard to predict precisely how, and across which geographical areas.

> "I expect AI to bring challenges similar to what globalization brought. In economic terms a very good thing, but with huge distributional and equality impacts."

Ethics was also a major concern. Respondents raised questions about whether robots and AI systems should have to work 'for the good of humanity' rather than simply for a single company, how to look after those who lost their jobs to AI systems, and changes that might be required to taxation systems to recognise the new reality.

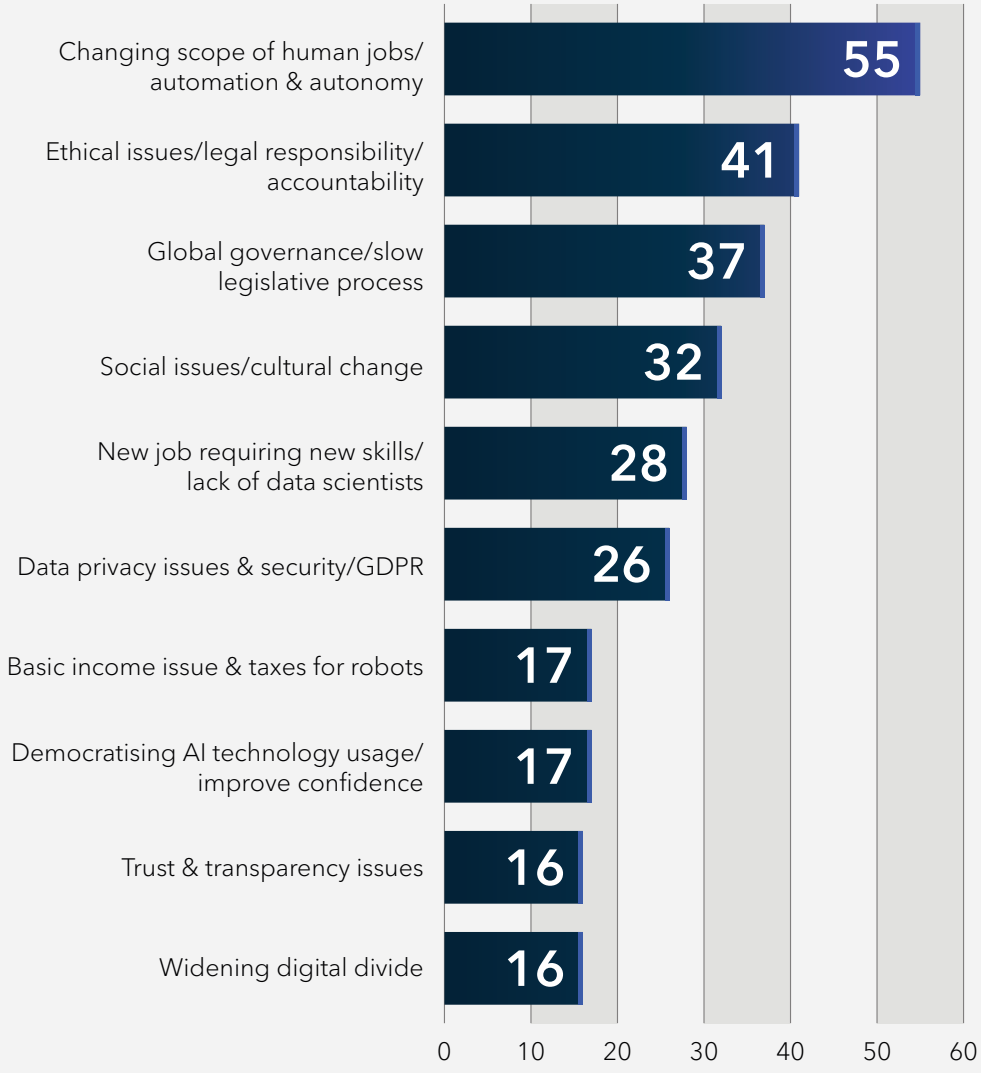
> "There is the big problem that AI does not work ethically or morally….and you can teach AI to behave badly."

It was likely that any changes would have a significant lag on the introduction of the technology, which might create problems both practical and ethical. Few, if any, political parties were currently prepared to handle this.

Ethics and jobs were therefore inextricably linked, and organisations would do well to consider ethics at an early stage if they wish to contribute to the debate.

> "If we can have a chat bot tell us the latest news, the stock market and all the financial numbers, the next step is for it to tell you the story behind the numbers in an interpretable way...I think that's really valuable."
>
> **Kirk Borne, PhD,**
> **Principal Data Scientist at Booz Allen Hamilton**[1]

What challenges do you expect to see as more AI is rolled out by business, government and perhaps even individuals?



Source: The Enterprise AI Promise Study. August 2017. N =100, multiple responses allowed.

[4] http://blogs.sas.com/content/sascom/2017/08/31/3-machine-learning-technologies-3-three-years/

Navigating to value

Urgency is gathering around the concept of AI. The vast majority of our respondents expected to see big changes within the next ten years, as AI becomes more ubiquitous. They also expected to encounter challenges both in introducing AI, and as a result of doing so.

The biggest challenges of introducing AI were seen as the cultural issues. Respondents wanted to know whether AI would be accepted within and beyond their organisations. How, they wondered, would the culture, both organisational and national or international, need to change to allow this? Technology tends to lead regulatory change by some considerable time, and AI was unlikely to be an exception to this rule. The ethics of AI introduction would need to be thought about well in advance of regulatory change.

Changing the world of work

Perhaps the most concrete concern was about how jobs would change as a result of AI. This is probably unsurprising, since eminent commentators such as Stephen Hawking have said several times that this will be a major issue. Our respondents recognised, however, that the situation is not as simple as 'lots of jobs will go', but is likely to be much more nuanced. In practice, jobs will go, but new roles are also likely to emerge as a result of AI.

These new jobs will include training AI systems, ensuring that they continue to operate as planned, and do not learn the 'wrong' thing, and in bridging the gap between business and technology. But perhaps the most promising range of new jobs is likely to be in innovation: generating and delivering new ideas that are only possible because of the changes brought about by AI.

These changes support our respondents' idea that cultural change will be necessary. AI is very unlikely to be 'more of the same'. We do not yet know what changes it will bring, but there will be both 'known' and 'unknown unknowns'.

A cycle of learning

It is clear that we will have to learn new skills to partner effectively with AI-driven algorithms. The future will belong to those who realise that, and start to develop those skills early. But the learning will not stop when the partnership starts. Just as AI algorithms learn from experience, so will their partners. The augmentation of both sets of capabilities is likely to continue, creating a virtuous cycle of learning.

It may not be a simple cycle, however. The speed of AI development suggests that this learning cycle may actually turn out to be exponential: that each partner could learn so much from each other and the experience that capacity doubles or even trebles. Now that's a future worth working towards.

Building and developing

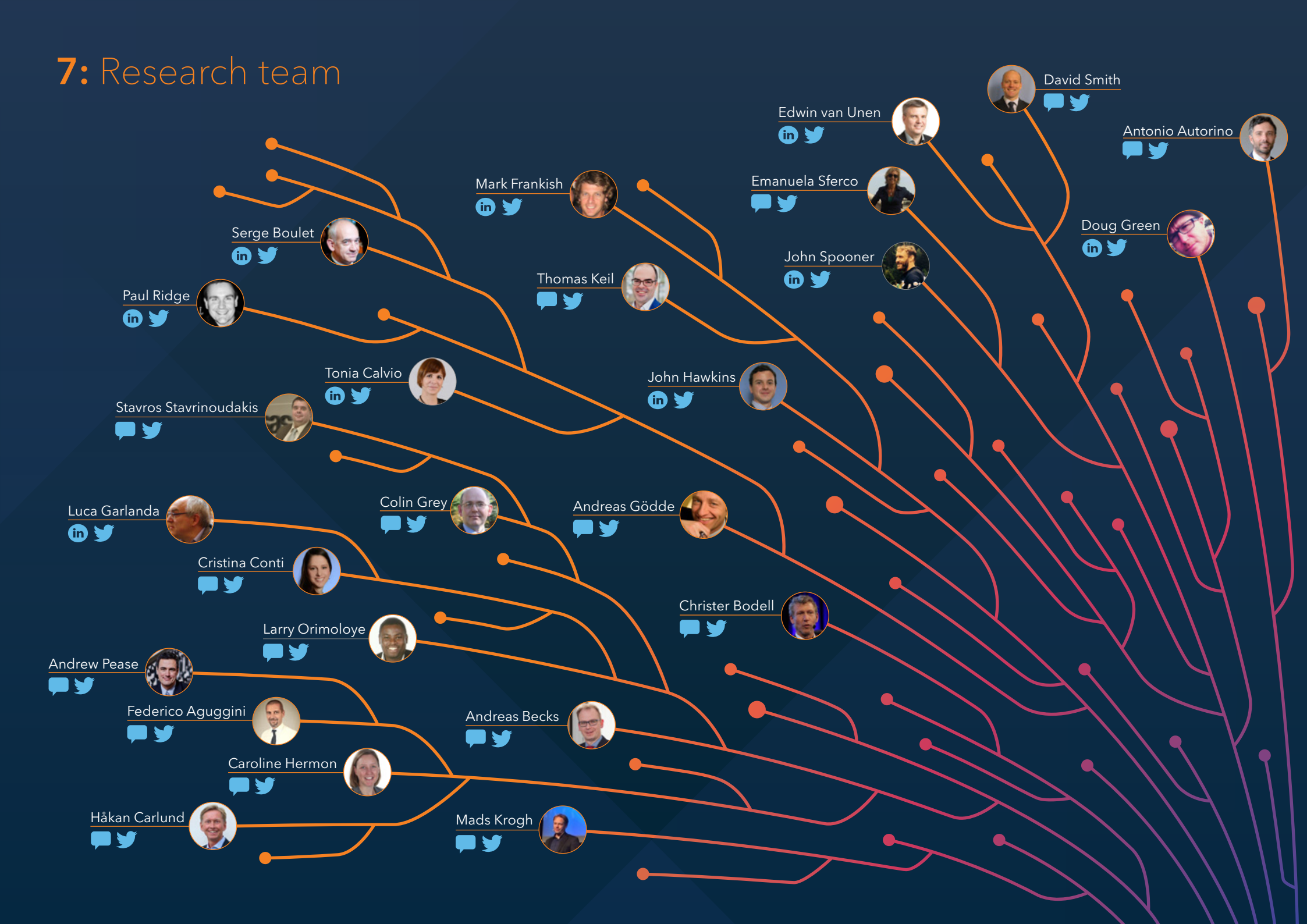
What is already clear, however, is that AI is not going to take over. Its arrival will not herald a mass removal of people from work, as they step back and spend more time with their families. Many of the areas seen as likely to be early adopters or users of AI were linked by something different: partnership between humans and AI.

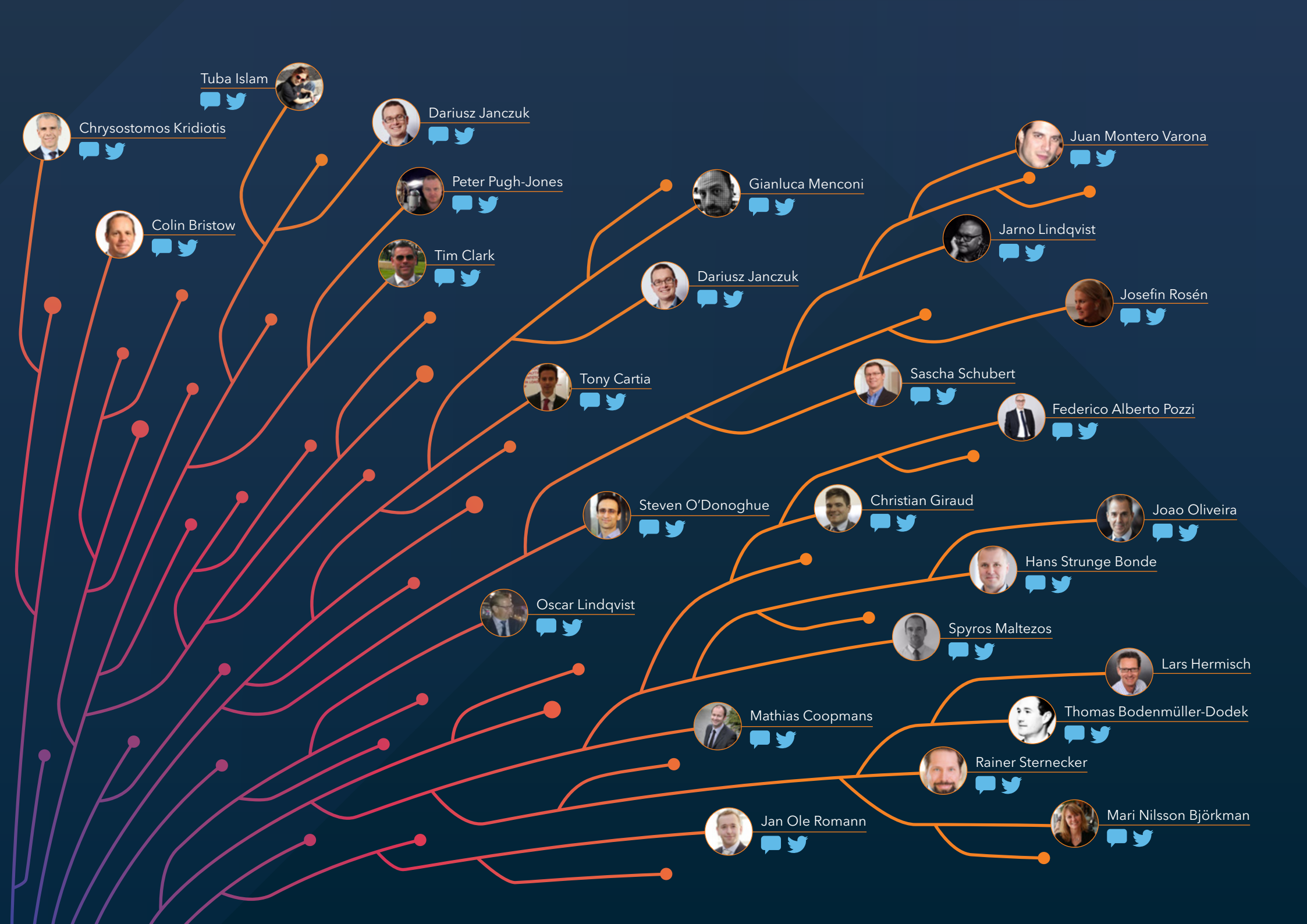
From self-driving or connected cars, through to virtual assistants, chatbots and decision-making support, one thing was clear: AI would be used to augment human capacity, not replace it. At its simplest, AI will take over some parts of some jobs, but will free up human time to concentrate on higher value work.

Humans will, however, need to take over when things get tough. Some banks, for example, are experimenting with introducing chatbots in their customer service operations. The chatbots can deal with simple queries like password resetting, but when conversations get more difficult, or start to become circular, bots hand over quickly and efficiently to a human operator. We might think of this as a sequential partnership: first the machine, then the person. This type of partnership is likely to develop in a wide range of cases where there are processes with multiple steps, some more complex than others.

In more complex cases, and as AI technology matures, the AI–human partnership is likely to be different. Instead of being sequential, it is likely to be a more traditional partnership, bringing together the skills and capabilities of both partners to create a new 'whole' greater than the sum of its parts. We can already start to see this happening. Citizen data scientists, for example, will be better able to generate insights when they are partnered with more powerful algorithms, especially those that can learn from previous interactions.

7: Research team




Tuba Islam
Chrysostomos Kridiotis
Dariusz Janczuk
Peter Pugh-Jones
Colin Bristow
Tim Clark
Gianluca Menconi
Dariusz Janczuk
Juan Montero Varona
Jarno Lindqvist
Josefin Rosén
Tony Cartia
Sascha Schubert
Federico Alberto Pozzi
Steven O'Donoghue
Christian Giraud
Joao Oliveira
Hans Strunge Bonde
Oscar Lindqvist
Spyros Maltezos
Lars Hermisch
Mathias Coopmans
Thomas Bodenmüller-Dodek
Rainer Sternecker
Jan Ole Romann
Mari Nilsson Björkman

8: Further reading

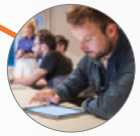
The Next Analytics Age:
Artificial Intelligence
Harvard Business Review
Whitepaper

AI SAS Talk
SAS/Oliver Schabenberger
Video

Big Data and Artificial Intelligence
are Mainstream and not Mundane
SAS/Andrew Pease
Blog

Advanced Analytics: Moving Toward AI, Machine
Learning, and Natural Language Processing
TDWI
Whitepaper

The Marketing Analytics Must-Haves:
Don't get Left Behind
SAS
Insights Article



SAS® in the Open Ecosystem
SAS
White Paper

AI Primer
SAS
Insights Article

Machine Humanity: How the Machine Learning of
Today is Driving the Artificial Intelligence of Tomorrow
SAS
Whitepaper

Artificial Intelligence: Separating the Reality from the Hype
SAS/Oliver Schabenberger
Blog

Artificial Intelligence for Executives: Integrating AI into your analytical strategy
SAS
White Paper

5 Questions about Artificial Intelligence with Intel's Pat Richards
SAS/Intel
Blog

Improve Customer Experience with Actionable Artificial Intelligence
International Institute for Analytics
White Paper

SAS Machine Learning and AI
SAS/Steve Holder & Wayne Thompson
Video

Deep Learning Primer
SAS
Insights Article

The Machine Learning Primer
SAS
eBook

To contact your local SAS office, please visit:
sas.com/offices