

AI-fuelled organisations

Reaching AI's full potential in the enterprise

FOR SOME ORGANISATIONS, HARNESSING ARTIFICIAL INTELLIGENCE'S full potential begins tentatively with explorations of select enterprise opportunities and a few potential use cases. While testing the waters this way may deliver valuable insights, it likely won't be enough to make your company a market maker (rather than a fast follower). To become a true AI-fuelled organisation, a company may need to fundamentally rethink the way humans and machines interact within working environments. Executives should also consider deploying machine learning and other cognitive tools systematically across every core business process and enterprise operation to support data-driven decision-making. Likewise, AI could drive new offerings and business models. These are not minor steps, but as AI technologies standardise rapidly across industries, becoming an AI-fuelled organisation will likely be more than a strategy for success—it could be table stakes for survival.

In his new book *The AI Advantage*, Deloitte Analytics senior adviser Thomas H. Davenport describes three stages in the journey that companies can take toward achieving full utilisation of artificial intelligence.¹

In the first stage, which Davenport calls *assisted intelligence*, companies harness large-scale data programs, the power of the cloud, and science-based approaches to make data-driven business decisions.

Today, companies at the vanguard of the AI revolution are already working toward the next stage—*augmented intelligence*—in which machine

learning (ML) capabilities layered on top of existing information management systems work to augment human analytical competencies.

According to Davenport, in the coming years, more companies will progress toward *autonomous intelligence*, the third AI utilisation stage, in which processes are digitised and automated to a degree whereby machines, bots, and systems can directly act upon intelligence derived from them.

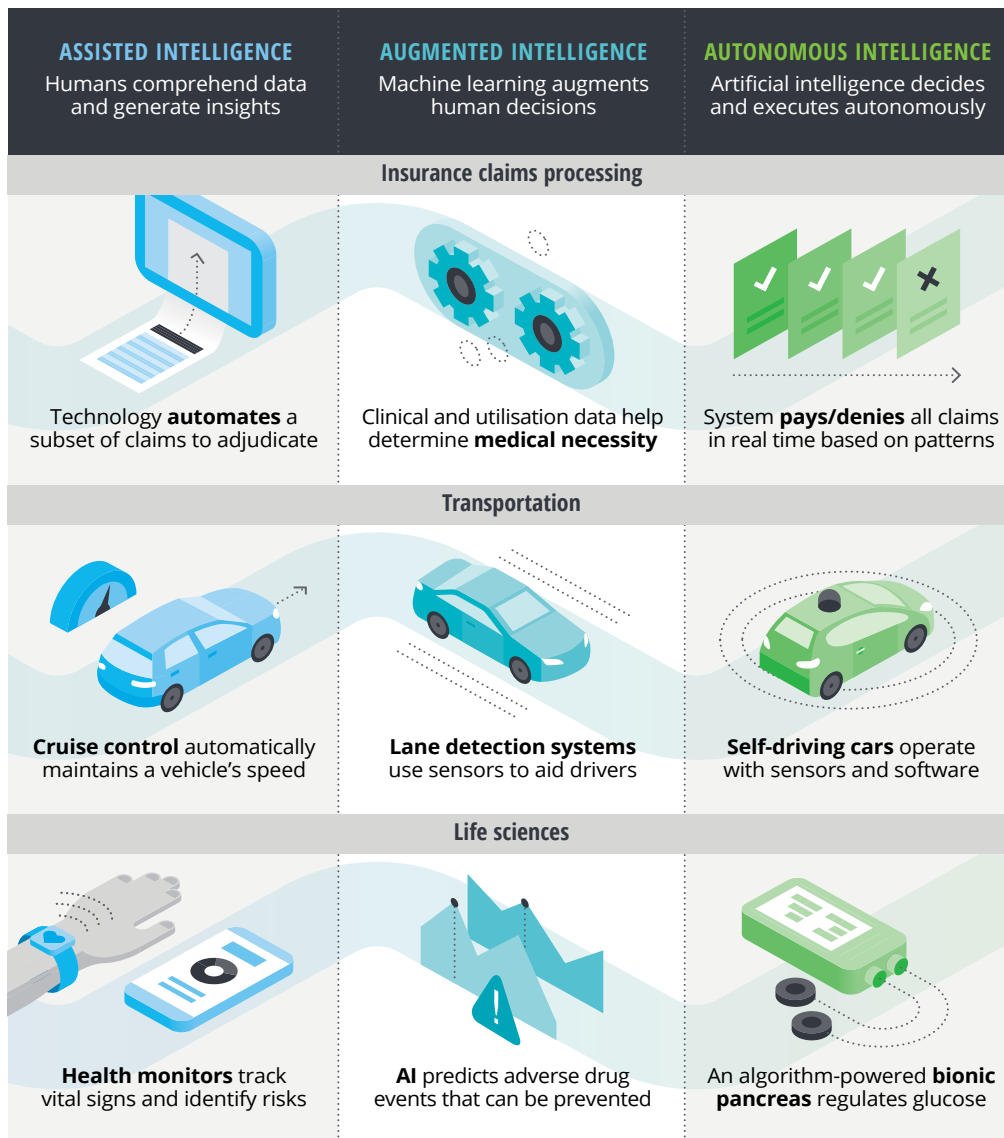
The journey from the assisted to augmented intelligence stages, and then on to fully autonomous intelligence, is part of a growing trend in

which companies transform themselves into “AI-fuelled organisations.” This trend is also about a sustained commitment to redesigning core systems, processes, and business strategies around AI and its possibilities. Its end goal: an AI-fuelled organisation in which humans and machines work

together within designed digital systems to harness data-driven insights.

Over the last decade, *Tech Trends* has chronicled the emergence of AI and other cognitive technologies, and their growing disruptive potential. The *AI-fuelled organisation* trend, as we recognise it today, found its footing during the last several

FIGURE 1
Bringing the evolution of artificial intelligence to life



Source: Thomas H. Davenport, *The AI Advantage*. Deloitte analysis.

years when a few pioneering companies began experimenting with bots and other cognitive technologies to better understand their potential impact on productivity.² We now see companies representing all industries and regions embarking on their own AI-fuelled journeys. For example, the German retailer Otto is currently using AI and ML to make operational decisions autonomously at a scale that humans cannot match.³ In the financial services industry, Zurich Insurance Group is using intelligent bots to process personal injury claims.⁴

Meanwhile, companies even further along in their AI journeys are looking beyond discrete initiatives and beginning to approach AI as an integral component of corporate strategy. A recent survey by the *MIT Sloan Management Review* and Boston Consulting Group of more than 3,000 business executives found that pioneering companies such as Chevron, Allianz, and Daimler are deepening their commitments by prioritising revenue-generating AI applications over cost-saving ones. They are scaling AI throughout their enterprise operations and are involving high-level management in AI initiatives. Notably, of the surveyed executives from pioneering companies, 90 percent report already having AI strategies in place.⁵

The number of companies following in the footsteps of AI pioneers will likely increase in the next 18 to 24 months as companies identify ways to use cognitive technologies to achieve strategic goals. This process is already underway. In two consecutive global surveys (2016–17 and 2018), Deloitte has asked CIOs to identify the emerging technology in which they plan to invest. Cognitive technologies/AI has consistently topped the list.⁶

Though these CIOs—much like society at large—may be fascinated by cognitive technologies’ sci-fi-like possibilities, their AI ambitions are likely grounded in more practical (and achievable) benefits: Pursued strategically across cognitive’s three stages, AI can increase productivity, strengthen regulatory compliance through automation, and help organisations derive meaning from ever-larger data sets.⁷

Enterprise tech leaders, start your engines. The time to launch your company’s AI-fuelled journey is now.

AI, AI—oh!

The AI-fuelled organisation trend is the latest in a series of technology-driven transformations that have delivered quantum leaps in productivity. In the early 20th century, new tabulating machines helped workers organise data and perform calculations. The 1950s saw the emergence of programmable systems—early antecedents of today’s computing and internet technologies. And at the dawn of the new millennium, cognitive technologies such as AI, ML, and robotics began augmenting and amplifying human intelligence, a transformation that continues to disrupt operational models and illuminate new opportunities.⁸

FIGURE 2

The top five benefits of AI

Percentage of survey respondents who rated each benefit in the top three for their company



Source: Deloitte Consulting LLP, *State of AI in the Enterprise*, 2nd Edition, October 22, 2018.

Today, the possibility of achieving the next quantum leap in productivity propels our march toward autonomous intelligence.⁹ The human brain can decipher and derive meaning from large volumes of data, but this unique ability is limited by the amount of data our brains can absorb at any moment. Unlike the human brain, AI has no such limitation, which has the net effect of turning a trickle of business insights into a raging river of strategic possibilities. More and better insights delivered autonomously can lead to increased productivity, greater efficiency, and lower operational costs. Yet in the context of AI, these three may prove to be low-hanging fruit. Consider how autonomous AI could fuel other opportunities, including:

- **Enhanced regulatory compliance.** Despite companies' best efforts, regulatory compliance remains a moving target, due largely to the pervasive nature of human bias. While subjective opinions and differing worldviews make for interesting conversation, they also make it challenging for any two (or more) people to interpret laws and regulations the same way. This is why we have judges. Algorithms, by contrast, do not have fluid thought processes: They always interpret and execute according to the literal letter of the laws with which they're set up. By intelligently automating compliance functions in IT systems, companies can leave human cognitive maneuverability to machine-based robotic execution, which is, ideally, free of subjectivity, bias, and mood.¹⁰
- **"Mass personalisation" of products and services.** Today content, products, and services are largely designed for mass consumption. In the near future, they will likely be customised based on individual users' personas, needs, wishes, and traits—an approach known as *mass personalisation*. What's more, this degree of personalisation will take place both statically and dynamically. Some companies are already working toward this goal. In the media sector, for example, Netflix is developing an AI plat-

form that creates personalised movie trailers based on the streaming histories of individual viewers. This is one element in the company's larger content strategy for using data to inform creative decision-making around genre, casting, and plot development.¹¹ (Learn more about mass personalisation and the technologies that make it possible in the *Beyond marketing: Experience reimaged* chapter of *Tech Trends*.)

- **Asset intelligence.** Today, companies rely heavily upon human intelligence to interpret, anticipate, and intuit information in ways that machines cannot. That's about to change. In the future, the intelligence generated by data intelligence generated from company assets—infrastructure, IT systems, and inventory, for example—may surpass human insights as organisations' most mission-critical business intelligence. Sensors embedded in vast IoT networks, computer vision, and machine learning will feed data into analytics systems in real time. AI tools, acting autonomously on the resulting insights, can reconfigure dynamic pricing on store shelves, recalculate warehouse staffing projections, calibrate manufacturing machines, and optimise supply chains.

AI's next top model

Indeed, organisations are using AI in innovative ways, but as the *AI-fuelled* trend progresses, more companies will evolve, moving from using the technology in isolated pilots to deploying larger AI systems. But which systems? Three system models are currently in play:

- **Cloud-native model.** Given AI's ascendance in the enterprise technology arena, it is conceivable that an AI-as-a-service platform could be the next big operating system. This may or may not happen, but even the possibility has set off a gold rush of sorts among major (and minor) tech players to build AI-based platforms. AWS, Microsoft, and Google Cloud Platform

are investing heavily in big data, ML, and AI capabilities, while Chinese vendors Alibaba and Baidu are developing a host of cloud-based AI solutions. None of these deep-pocketed tech giants has yet seized a first-mover advantage, but competition—and potential rewards—are steadily increasing.¹² Deloitte Global predicts that in 2019, companies will accelerate their usage of cloud-based AI software and services. Among companies that adopt AI technology, 70 percent will obtain AI capabilities through cloud-based enterprise software, and 65 percent will create AI applications using cloud-based development services.¹³ Stay tuned.

- **Package-adjunct model.** In an alternative approach to the cloud-native model, several vendors are putting existing general-purpose AI platforms in the cloud. For example, IBM is now making Watson's AI and ML capabilities available to cloud customers.¹⁴ Salesforce is taking a slightly different tack with its Einstein platform: The company is acquiring AI capabilities to add to its cloud services portfolio.¹⁵ Similarly, SAP and Oracle continue to embed AI capabilities into their existing product suites.¹⁶
- **Open-algorithm model.** Established vendors with deep pockets are not the only companies to recognise a big opportunity in AI, and it is not a given that a single cloud-based or vendor model will come to dominate the market. For this reason, numerous startups and boutique software shops are developing AI solutions to meet specific business needs, use cases, and

verticalised issues. Until market consolidation gains momentum and standards begin to emerge, expect more highly innovative startups to enter the AI fray—and for some of their early efforts to result in scalable deployments.¹⁷

Intelligence: Artificial and human

An AI-fuelled organisation places AI, ML, and other cognitive technologies at the very center of business and IT operations. While this may sound like a straightforward proposition, its disruptive ramifications will likely ripple across the enterprise, with particular impacts in the following areas:

- **Data management.** To realise the benefits of becoming an AI-fuelled organisation, you'll need to put in place more dynamic data governance, storage, and architecture. Advanced data management fuels an enterprise AI engine and is a core building block for deriving autonomous insights from your vast data stores. Data needs to be tagged properly before being fed to AI, and your team should be prepared to provide the business context for that information. To become an AI-fuelled organisation, you will need access to the right data sets, the ability to train algorithms on that data, and professionals who can interpret the information.

While AI offers an opportunity to process, analyse, and act on data at phenomenal speeds,



Deloitte Global predicts that in 2019, among companies that adopt AI technology, 70 percent will obtain AI capabilities through cloud-based enterprise software, and 65 percent will create AI applications using cloud-based development services.

quality data is necessary to stand up AI in the first place. Unfortunately, preparing data for AI deployments—and then creating the dynamic capabilities you will need to manage it—can prove challenging. Of the roughly 1,100 IT and business executives interviewed for Deloitte’s second annual *State of AI in the Enterprise* survey, 39 percent identified “data issues” as being among the top three greatest challenges they face with AI initiatives.¹⁸

- **Training machine learning.** To function, AI technologies rely on ML algorithms operating within neural networks that must be “trained” on massive volumes of data. In the context of the global AI gold rush, China—which takes a different approach to data privacy from those of many other nations—currently has an advantage. As they train their neural networks, Chinese developers enjoy ready access to enormous data sets owned by firms such as Alibaba and Baidu, all of which are ultimately controlled to a greater degree.¹⁹ In Western economies, companies lack comparable access to vast, controlled data stores, which puts them—at least for now—at a competitive disadvantage.

39%

of Deloitte’s second annual *State of AI in the Enterprise* survey respondents identified data issues as among the top three greatest challenges they face with AI initiatives.

Yet there is an alternative technology-based means for training AI that may help companies overcome this data access challenge. DeepMind, a UK-based company owned by Google, has developed a system for training neural networks on simulations rather than on real data. In other words, DeepMind’s AI solution trains itself. It’s too early to tell whether simulation-based AI training can fully match the benefits of training with traditional data, but it does offer an alternative approach that could put AI training and full deployment within the reach of millions of companies around the world—including startups without years of data sets already in hand.²⁰

- **Ethical AI.** The current debate surrounding the ethical ramifications of using AI and its potential impact on society isn’t ending anytime soon.²¹ In the absence of ethical consensus on so many aspects of cognitive technologies, individual companies on AI journeys should factor ethical considerations—as well as their organisation’s values—into the development of their own AI solutions. Though a few organisations operating at the vanguard of cognitive exploration are using machines to write code, by and large humans continue to write it. As such, all their biases, assumptions, and perceptions may find their way into the algorithms being developed.²² As you build your AI-fuelled organisation, ask yourself: What does ethical AI mean? How do governance and ethics overlap? Do the algorithms we are creating align with our values and those of society in general? How can you build transparency into AI decision-making? How can you calibrate algorithm models more consistently to remove the unconscious bias that may exist in underlying data or in the surrounding environment?
- **Talent.** Only the biggest companies with the deepest pockets likely have the resources to keep industry-leading AI talent on the payroll on a permanent basis. Moreover, as more organisations become AI-fuelled, competition for expertise will only increase. How will you secure the talent and skills you need to compete in

As we move into the AI-fuelled model, workers will have to adapt to a more advanced end state in which humans and machines interact and collaborate in ways that, until recently, existed only in the realm of science fiction.

this climate? The first step is to jettison the old-school idea that employees are, and must always be, full-time workers. As discussed in Deloitte's [2018 Global Human Capital Trends](#) report, "the traditional employer-employee relationship is being replaced by the emergence of a diverse workforce ecosystem—a varied portfolio of workers, talent networks, gig workers, and service providers that offers employers flexibility, capabilities, and the potential for exploring different economic models in sourcing talent."²³ This does not mean that full-time workers will no longer have a role to play in IT. It does mean, however, that as cognitive technologies and automation transform IT roles and skill sets, the definition of talent will evolve to include:

- full-time employees you can attract and hire
- contracted freelancers working in the gig economy
- crowdsourced activities, such as the creation of algorithms
- bots that automate some business processes and act as digital full-time employees

This last talent category—bots—is important. In the future, humans and machines will likely complement each other's efforts effectively, with intelligent bots assuming many of the tasks that full-time employees perform today. This will free humans from low-value, repetitive drudgery to focus on tasks and initiatives that create value. This hybrid talent model lies at the heart of what we foresee as the "future of work."²⁴ It is

also a foundational component in the AI-fuelled organisation.

- **Organisational and culture changes.** Among the most prized IT skills today are those in the areas of data analysis, data modeling, and applications development. As AI adoption grows, companies will increasingly value expertise in data science, algorithm development, and AI system design—with special emphasis on the human-centered design skills required to develop personalised user experiences. For CIOs, this presents a challenge: What do you do with existing talent whose expertise lies in legacy systems? You can retrain, reskill, and retool your workers, or change your workforce altogether. Some CIOs may find that the best way to meet their needs is by pursuing both options, to the extent possible.

Yet retraining and acclimating legacy talent to the world of AI may present its own challenges. It's not about just learning a new skill—it requires adapting to a new culture. AI-fuelled organisations work in unorthodox ways. Anecdotally, we have seen companies struggle to get their people to accept using analytics to perform traditional tasks. As we move into the AI-fuelled model, workers will have to adapt to a more advanced end state in which humans and machines interact and collaborate in ways that, until recently, existed only in the realm of science fiction. What will an organisational culture shift of this magnitude mean for AI adoption, buy-in, support, and sponsorship?

- **Insights, not information.** Traditionally, CIOs have spent much of their workdays (and careers) maintaining legacy systems and

“keeping the lights on.” As AI, ML, and other cognitive tools drive automation across the IT ecosystem, CIOs and their teams may spend less time on maintenance and more time helping the enterprise with informed decision-making about how they use and what they expect from technology. CIOs have unique insights, directly affecting business strategy and tactics, to address key questions:

- What are the data assets within an organisation?
- How could one monetise those assets?
- What insights could be generated from those assets?

- How do you interpret those insights?
- How do you use these insights to generate meaningful outcomes?
- Consequently, how do you make informed decisions on new products and services for your customers while at the same time increasing the engagement with those customers?

Ultimately, the AI-fuelled journey presents CIOs with an opportunity to redefine their own role, from chief information officer to “chief insight officer”—the organisational leader who serves as custodian, facilitator, and catalyst for informed decision-making at the corporate level.²⁵

LESSONS FROM THE FRONT LINES

PFIZER: AI-FUELLED BUT PEOPLE FIRST



The speed with which pharmaceutical company Pfizer has deployed artificial intelligence to accelerate innovation across its organisation demonstrates best practices that could serve as a model for the entire industry. “In terms of scaling up new technology, as an industry, we must work on moving that needle faster,” says Mary Hall Gregg, vice president of business technology, research, and development. “Speed and efficiency are critical if we want to improve patients’ health and quality of life; AI allows us to move forward, faster. Without it, it will take too long to have the kind of impact we need.”²⁶

Technology and business leaders within the organisation quickly recognised AI’s potential to deepen Pfizer’s understanding of patients and their diseases, as well as accelerate the process of drug discovery and delivery to the market. But to realise that potential, the company needed to take a broad organisational, business-driven view, and be willing to “fail fast”—to quickly identify when an approach may not work and make appropriate changes. Pfizer saw AI as an untapped opportunity to enable innovation and a means to gain competitive advantage, but with so many potential applications, it needed to gain precision on where to apply the technology.

Pfizer offered AI training across the enterprise, to help business executives understand the broad range of possibilities for the technology as well as to separate the facts from the science-fiction hype. The company held five AI boot camps in 2018, with more than 1,000 employees taking part. Understanding what’s possible with AI—and conversely, what the technology can’t solve—has played a vital role in helping Pfizer’s business units formulate their end goals, focused on driving speed, quality, and efficiency in areas as diverse as research

and development, patient safety, medical, finance, and the global supply chain.

Pfizer’s IT team—which placed a premium on agility and open-source technology—believed that the company would be served best by building an in-house AI workforce that could employ a wide range of tools, from natural language processing to neural networks to statistical models and more. Pfizer chose to invest in people—establishing an AI Center of Excellence and hiring AI developers who understood the pharmaceutical business and could rapidly apply AI techniques within a business context. With a software-driven approach and a significant data management framework already in place, implementing AI required only a modest capital investment.

Ryan Steinberger, vice president of business technology at Pfizer’s Global Business Intelligence and AI Center of Excellence, explains, “AI adoption is accelerating at different rates across the enterprise. As one business unit innovates and begins to accelerate—such as the medical group did with natural language processing—other teams piggyback on that success, taking the lessons learned and applying that knowledge to their own business unit.”²⁷

To date, Pfizer’s AI-fuelled approach has enabled 30,000 colleague hours, a number that is continuously growing as more AI-fuelled automation is deployed each month. Other significant achievements include the deployment of the company’s scientific data cloud, which aggregates real-time data from a wide variety of instruments to create algorithms that improve compound prediction. The organisation is also speeding pharmaceutical development teams’ design-and-build process using AI. And it’s engaging with the US Food and Drug Administration to explore AI for use in adverse-event reporting—a dramatic shift

in the regulatory space. Finally, AI has allowed Pfizer to more effectively engage with physicians to inform them about the appropriate use of products

and customise engagement with patients who are participating in research, both of which have the potential to significantly improve patient outcomes.

CANADA'S GO-TO-MARKET IMPERATIVE DRIVES GLOBAL ETHICS DISCUSSION



Alex Benay, CIO of Canada, sees a convincing go-to-market imperative for governments to leverage artificial intelligence.²⁸ The need to keep up with industries such as banking and telecommunications—those with which the government does business and regulates—and the vast opportunities that AI affords its agencies are helping to drive Canada's push to operationalise the technology.

Public sector stakeholders face unique challenges in effectively fostering, procuring, and leveraging leading-edge innovation: lengthy contracting cycles, restricted budget dollars, and more, while balancing the need for transparency. As such, the government is investing in public-private partnerships, pursuing procurement reform, and issuing ethics standards, with the goal of accelerating the use of AI across government and furthering Canada's comprehensive digital innovation strategy.

Most notable is the government's advocacy for and need to develop transparent policies to support the responsible and ethical use of AI. "A different paradigm surrounding AI exists in the public sector and for our citizenry," Benay contends. "For example, we don't believe governments should be handing over life-and-death policy decisions to black boxes and software when they don't have the means to validate outcomes or intervene in the decision-making process if necessary. Nevertheless, we collectively have to close the digital gap between government and the industries we're charged with overseeing by using the same technology they are."

Setting standards and guiding principles for the government's AI deployment—and those organisations doing business with the government—is at

the heart of Canada's digital strategy. And those standards are firmly rooted in the nation's values and ethics. The government is developing a directive on automated decision-making with input from the public; Canada's commitment to transparency allows citizens to monitor the process. This commitment to transparency will continue once the directive is approved, as it will direct federal departments to show Canadians how automation is being used to deliver services.

In addition to the directive, the Canadian government is developing a set of tools: an up-to-date list of approved AI vendors, from which departments can procure AI products and services; an algorithmic impact assessment tool to help project leaders determine how to select and apply AI within their particular functions; and an "ethical switch." That switch, developed with AI company Cognitive Scale, is an algorithm that identifies ethical biases in AI engines and aims to help mitigate them. The Canadian government is piloting the ethical switch so it can better evaluate countermeasures to deploy if biases within the AI program are encountered. Intended to be a failsafe, the switch is envisioned to monitor algorithmic decisions and pause the system so that human reviewers can take action.

And the government hasn't pursued its AI directive and policies in a bubble. Not only have officials consulted with citizens—they have consulted with corporations, academia, and other countries on the concept of openness, transparency, and traceability of decision-making. Canada's leaders, notably Scott Brison, the first-ever minister of digital government, hope to set an example and are working one-on-one with other countries and as part of the Digital 9

group of nations.²⁹ Benay shared the government’s draft directive at the November 2018 D9 meeting to elicit both feedback and support from the member nations. “These are heated conversations that cut to the core of public-sector ethics across the world,” he says. “It’s triggered a lot of discussion about the future role of public service in light of artificial intelligence and automation.” These conversations culminated in D9 members endorsing Canada’s AI principles, a signal of international cooperation on the responsible use of AI.

Benay (also co-founder of the nonprofit CIO Strategy Council, a Canadian collaborative that discusses digital transformation issues and looks to help set industry standards³⁰) stresses that the country’s AI directive is only the first iteration: It will be reviewed quarterly or semiannually and adjusted as the technology and ethical environment evolves. “This isn’t going to happen overnight,” he concludes. “But that’s a good thing on the ethical front: It’s important that the government takes the time to do AI properly and—more importantly—to respect Canada’s values.”

WORK THAT AI: THE ADECCO GROUP AUGMENTS ITS WORKPLACE—AND YOURS



Many have speculated about the potential for artificial intelligence to replace much of the human workforce,³¹ but the Adecco Group foresees a future in which *augmented intelligence* will enhance rather than replace human skills such as critical thinking, emotional intelligence, and value judgments. And the company is accelerating the use of the emerging technology across both its internal and market-facing functions. Leaders see two paths of opportunity for artificial intelligence: to amplify the Adecco Group employees’ recruiting efforts and performance through automation of core legacy tasks, and to offer innovations to clients to improve their talent recruitment and career management.

“We don’t see ourselves as a tech company,” says the Adecco Group CEO, Alain Dehaze.³² “But we see an opportunity to leverage technology to complement, advance, and even disrupt our existing business to stay attuned to today’s workforce.”

Currently, its general staffing brand, Adecco, uses Mya System’s chatbot to streamline its initial screening of candidates. The chatbot prescreens potential job candidates by matching their skill sets, experience, geographic location, availability, and salary requirements with open positions; it reaches out to suitable candidates to set up appointments

with an Adecco recruiter. Because automation provides better-qualified leads and follow-up happens quickly, both recruiters and candidates have responded positively.

The Adecco Group’s initial foray into AI prompted the company to explore other opportunities to scale the technology for greater efficiencies within other core processes across the enterprise, such as using robotic process automation to manage the time registration and payroll administration of 700,000 temporary workers daily, as well as applying analytics to prioritise work for company recruiters.

The market interest in AI-driven efficiencies in recruitment and hiring drove the Adecco Group’s acquisition of Vetterly in 2018, for its fully automated, zero-touch recruitment AI platform. The acquisition gained the company the algorithm it needed to expand its capabilities, while providing Vetterly’s AI engine with data on which it could train and learn over time. Vetterly began with listing IT-related jobs—such as programmers and DevOps professionals—because they were the easiest to codify and, in just a few months, had realised automated recruiting processes for the vast majority of the permanent positions for which it was seeking talent.

The firm also plans to capitalise on the market shift toward a gig economy, driven in most part by millennials seeking freelance work; it created YOSS (your own boss), an end-to-end digital marketplace that leverages AI to match supply with demand.³³ The platform helps build trust between freelancers and hiring companies and can match freelancers with benefits and training as well as handle payment arrangements.

“We see an opportunity to disrupt a traditional market, which is still heavily based in high-touch, personal relationships and contacts,” Dehaze says. “AI has given us the opportunity to grow our digital strategy and broaden our offering into a fast-growing digital recruitment market while also complementing our professional recruitment business. We want to grow these capabilities geographically as well as expand into additional vertical markets.”

GOOGLE CLOUD'S SMART SEARCH FOR UBIQUITOUS AI



While many companies are just beginning to explore the potential benefits of artificial intelligence, Google recognised the value the technology can bring to its business model from the beginning.³⁴ Over the course of the last five years, the organisation has gone from deploying AI in narrow strategic areas to becoming “AI-first” and mandating its use across the Google enterprise. And it’s taking best practices gained from operational use and building those AI capabilities into nearly all its products. Now, Google Cloud is working to bring Google’s innovation in AI to all businesses.

“We’ve found that in most cases where we had a particular business challenge, artificial intelligence could be applied to help us solve it,” says Rajen Sheth, senior director of product management at Google Cloud Artificial Intelligence. “We believe every company is going to be transforming itself with AI over the course of the next 10 years, so we felt it was imperative that we deploy it broadly as part of our own business strategy.”

One of the keys to successfully applying artificial intelligence, Sheth says, is identifying an internal business challenge and then exploring how AI might solve it. For example, Google Cloud leveraged Google Assistant technology to personalise experiences with the service department in its customer contact center. Using natural language recognition and simulation combined with machine learning

automates the handling of tier 1-level calls. Rather than asking a generic set of questions from a script, the technology is able to understand the specific issues about which the customer called and access the knowledge repository to provide relevant questions and comments in a conversational manner. Another use case for AI allowed Google Cloud to improve the energy efficiency in its data centers: Using machine learning to set cooling system algorithms and reinforcement learning—where the system tries different things to test an outcome and then retrains itself based on findings—the system learned, on its own, what the optimal settings were. The cooling energy needed was reduced by 40 percent, resulting in a 15 percent reduction in overall data-center energy usage and producing significant cost savings for the organisation.

Google Cloud continues to explore internal deployment opportunities that could inform future commercial product development—from demand forecasting to systems control optimisation and quality control. Its AI team is exploring use cases for artificial intelligence across the medical, scientific, and automotive industries, and it’s made its AI training program open source so that all technologists can benefit from the learning. It is also devoting resources to investigating how to monitor and analyse AI behaviour, to detect and rectify bias in AI engines, and to facilitate the transformation of a traditional workforce in the age of machine learning.

MY TAKE

RAJEEV RONANKI, CHIEF DIGITAL OFFICER, ANTHEM

Digital technology is fundamentally transforming the way we interact with the world. People, machines, data, and processes are becoming increasingly connected, and the result is an explosion of information that can be used to understand customer needs. Yet the sheer volume of data and data sources required to get us where we need to go has exceeded the pace and scale of our human capacity to process it. Enter artificial intelligence. Poised to lead the next wave of exponential change disrupting health care, AI can mobilise analytics and automation to deliver moments that matter. The winners in the health care industry will be those organisations that not only empower patients to own their health data but use AI to generate actionable insights from data in real time to drive engagement and outcomes.

Our multidimensional digital transformation strategy and AI-first mindset help us treat every individual as a population of one. Our first step was to stand up a platform-based AI engine rather than point-to-point data solutions. We invested heavily over the years in our underlying data management capabilities as a foundation for this transformation. For example, our data infrastructure was already able to process both structured and unstructured data, feeding and curating our data pipeline and continually governing and certifying the data. Next was implementing data governance, security, and a trusted layer around the data stores. We added machine learning engines, algorithm layers, and software development kits, which facilitated building out APIs for portal, mobile, and internal channels. And we built feedback mechanisms allowing our AI to evolve from gathering data to providing insights to prompting actions—automating and speeding up processes and continuously learning from the feedback to improve future interactions.

Also critical to realising the full potential of AI across Anthem was gaining enterprisewide support for the initiative, which meant conceptualising with our stakeholders the positive business outcomes we could achieve. We asked our business partners for input on how we could use AI to rethink, reimagine, and reimplement across core business processes. Initially, we focused on automating data processing and analysis where AI could have the most impact on our business: serving customers more efficiently. The team identified operational functions, including claims adjudication, prior authorisation of procedures, provider payments, and consumer/customer billing functions as the top choices for the initial pilot programs. We built a proof of concept for each, and if the application provided value, we doubled down to scale it, applying agile techniques, and pushing the process into production.

Finally, we knew that, to execute on our vision for AI throughout Anthem, we needed to be proactive in broadening our talent base. So we created Anthem AI, to attract skilled technologists and cultivate existing internal talent by offering a structured AI training program. The unit works to retain that talent by building a culture that promotes innovation and ideation of AI solutions for the business.

Currently, AI is just one technology fueling our digital transformation across the enterprise. One of our recent projects is a yearlong data trial to test whether blockchain and precision medicine, along with AI, can predict when people will experience allergies. The hope is that our predictive model can add accuracy, speed, and cost-effectiveness to health-related insights.

One thing we've learned from this journey is to do away with the notion of starting with a greenfield. Instead, we see how AI can impact business outcomes, then connect related, fit-for-purpose use cases to achieve small wins. By approaching AI and machine learning with a process-level view, we've been able to deploy next-generation technology in a way that significantly improves our customers' experiences.

RISK IMPLICATIONS

Cybersecurity professionals are becoming exceedingly aware of the threat of hackers using artificial intelligence to gain access to customer and organisational data.³⁵ However, as we navigate the risk, security, and privacy implications of AI technology, it is important to understand that AI also can be an effective tool to fight cybercrime, fraud, and threats. As AI gets more intelligent over time, learning from events and feedback loops to increase its ability to recognise threats and vulnerabilities, its accuracy in determining the likelihood of an event will become even more precise. Here's how.

- **Automation to detect and fight cyber threats.** Over the last decade, many organisations have employed on-premises security information and event management solutions to monitor threats to their networks and data, which required a significant investment of time, personnel, hardware, and money. IT teams have battled a rising number of increasingly sophisticated threats, often via labor-intensive, manual processes that take too much time to be entirely effective. Analysts watched for events and indicators of compromise, passing occurrences up the line from triage to threat-hunters to Level-4 incident-response specialists, all while sorting through frequent false positives. Today's threat vectors are continuously evolving and changing, requiring faster, more proactive detection and response, often through security orchestration automation and response tools, which automatically execute remediation actions such as shutting down routers and ports or locking down endpoints in near-real time.
- **AI versus AI.** Many of the cyberattacks that organisations confront today are orchestrated by AI engines on behalf of bad actors exploiting

gaps in their targets' security. The good news is that companies can deploy AI technology as a proactive measure against these attacks, speeding detection and response. Cognitive computing has enabled the ability to process data in real time—particularly unstructured data such as documents, images, files, and audio—so that artificial intelligence can learn from that data and automatically adapt its threat detection and response as new threats evolve.

- **Machine learning to identify new threats.** Traditional rules- and experience-based threat-detection systems were handicapped because they typically could search only for known threats, which account for just a small number of cyberattacks. Organisations can infuse artificial intelligence and machine learning into a rules-based environment to augment the expertise gained from previous, known cyber threats

Organisations can infuse artificial intelligence and machine learning into a rules-based environment to augment the expertise gained from previous, known cyber threats with detection of new, evolving threats.

with detection of new, evolving threats. Today's enterprise has massive amounts of internal and external data at its disposal, all of which can offer insight into a system's vulnerabilities and potential external threats. Processing that significant amount of data in a timely fashion through the human workforce has been impossible. But with the supervised and unsupervised techniques and supporting technologies now available, such as graph databases and natural language processing, organisations can augment and layer threat models to increase visibility of both

known and unknown threats. This may be accomplished by bringing together data scientists and cyber professionals to create higher fidelity and more accurate alerts for security events, which may facilitate a more effective response.

- **But first, governance.** Finally, thwarting threats from outside the organisation is not the only factor organisations need to consider as they start to deploy AI both in singular use cases and across the enterprise. The speed with which AI engines act and make decisions, the sensitivity of the data they consume, and the ethical implications of decisions made, when not properly monitored or governed, can create an exponential risk within the organisation as harrowing as an external bad actor.

When deploying AI within your organisation, there must be a governance plan in place to monitor these AI engines, much as the HR department would oversee the management and behaviour of human employees. This governance encompasses a wide swath of considerations, including employee and customer privacy, data security and integrity, and safety in interactions between humans and machines. Data handling, management, and governance—both of direct data inputted into the AI engine as part of its training, as well as derived data, which results from AI’s feedback loop—becomes even more critical when rules-based artificial intelligence is able to act on its own.

ARE YOU READY?

No two companies will adopt a technology trend in the same way. Every organisation has its own goals, strengths, and weaknesses to ponder before it embarks on its own transformation journey. If you are unclear on what the AI-fuelled trend offers—or requires of—your organisation, ask yourself the following questions:

► **What business objective(s) can our organisation achieve by deploying artificial intelligence?**

Artificial intelligence may offer a wealth of benefits to your organisation, but only when viewed through a strategic business lens rather than as an IT project, and only when brand rhetoric gives way to measurable results. Collaborate across functions to identify the enterprise’s main objectives, then align the AI strategy alongside to achieve those outcomes. You may choose to pursue solutions that reduce costs, facilitate a leap in productivity, monitor compliance, reduce risk scenarios, or derive greater meaning from more data. The first step of the AI journey should be setting end goals, which will enable you to draw a much more detailed, actionable road map with clearly marked milestones.

► **How can I use AI to achieve a competitive advantage?**

AI is a broad category that includes natural language processing, computer vision, machine learning, and more, all of which can augment back-office, intra-office, and customer-facing systems. If you’re not sure where to start, look to your organisation’s vertical industry for guidance and inspiration. Proceeding with an eye on your industry’s trends can ensure that you’ll both meet customers’ needs and remain competitive. For example, in the financial services industry, developers are creating highly personalised products and services; a financial firm may want to initiate its AI pilots by creating a robo-adviser or chatbot that can offer customers one-on-one investment advice. Deriving your initial AI pilots and use cases from your industry’s trajectory—which you can understand better by talking to customers, vendors, and industry analysts—helps ensure that your resources are utilised to meet business goals.

► **Is my technology adequate for an AI-fuelled organisation? If not, how do I find the right partners to build my AI ecosystem?**

To move forward, your organisation's existing technology and talent pool may be inadequate to meet the needs of standing up an AI system. You might look to bring in next-gen IP, products, and solutions to broaden your ecosystem. Once you've determined where AI fits into your business processes, you can evaluate your existing technology, talent, and expertise to determine where there are gaps. You may decide to augment your existing resources by investing in startups that are further along in their AI journeys, or you may identify vendors and other industry partners with whom to collaborate and potentially co-invest in building market-ready applications with shared resources.

► **I'm sensing "cognitive fatigue" in my IT organisation. What should I do?**

There are companies that dove headfirst into cognitive only to realise that they had taken on too much, too soon. Underwhelming results from early cognitive initiatives can dampen enthusiasm for further exploration. If you find yourself in this situation, consider starting a "lessons learned" dialogue with stakeholders and IT talent to review what went wrong and what can be done differently in future initiatives. And discuss AI approaches that other companies in your industry have taken that delivered desired outcomes.

► **Do I think big and start small—or go all-in?**

More important than going big or starting small is moving purposefully. CIOs and business leaders appear to recognise the value of creating a long-term AI strategy to guide their efforts. Stay focused on the desired outcome and employ design thinking, and the right plan will fall into place. Begin by identifying opportunities for AI within your organisation, such as transactional, time-consuming tasks or data-heavy processes that require a bit of "tribal" knowledge. Carry out a cost-benefit analysis to determine whether an AI solution is feasible for that process, taking into consideration both existing resources and those you will need to acquire. Next, structure a pilot program around one of those transactions to run four to eight weeks. If those results are positive, you're ready to determine how you can move forward to scale to production and, eventually, expand to other products and service lines.

BOTTOM LINE

AI's role in the enterprise is growing as cognitive tools and tactics are standardised across IT environments. While it is true that in coming years, AI will likely be deployed not only to augment human performance but to automate some operational and business processes altogether, proactively printing pink slips is an ineffective means of planning for the next cognitive stage. Now is the time to fundamentally rethink the way humans and machines interact within working environments, and what they can achieve together in the AI-fuelled organisation of the future.

Contact



OLEG TYSCHENKO
Senior Manager, Technology Consulting
Deloitte MCS Limited
+44 20 7303 6891
otyschenko@deloitte.co.uk

Authors

NITIN MITTAL

Principal, Deloitte Consulting LLP

DAVID KUDER

Principal, Deloitte Consulting LLP

Risk implications

SAMIR HANS

Principal, Deloitte LLP

Endnotes

1. Thomas H. Davenport, *The AI Advantage: How to Put the Artificial Intelligence Revolution to Work* (Cambridge: MIT Press, 2018).
2. Nitin Mittal et al., *Machine intelligence: Technology mimics human cognition to create value*, Deloitte Insights, February 7, 2017.
3. *Economist*, "How Germany's Otto uses artificial intelligence," April 27, 2017.
4. Brenna Hughes Neghaiwi and John O'Donnell, "Zurich Insurance starts using robots to decide personal injury claims," Reuters, May 18, 2017.
5. Sam Ransbotham, Philipp Gerbert, Martin Reeves, David Kiron, and Michael Spira, "2018 MIT Sloan Management Review and The Boston Consulting Group (BCG) Artificial Intelligence Global Executive Study and Research Report," *MIT Sloan Management Review*, September 17, 2018.
6. Bill Briggs et al., *2018 global CIO survey: Manifesting legacy*, Deloitte Insights, August 8, 2018.
7. David Schatsky, Craig Muraskin, and Ragu Gurumurthy, "Cognitive technologies: The real opportunities for business," *Deloitte Review 16*, January 26, 2016.
8. Deloitte US, "Welcome to the age of 'with': Intelligent AI solutions with cognitive advantage," YouTube, July 23, 2018.
9. Thomas H. Davenport and Rajeev Ronanki, "Artificial intelligence for the real world," *Harvard Business Review*, January-February 2018.
10. Deloitte, *Compliance modernisation is no longer optional*, 2017.
11. Mahesh Charjan, "Netflix to try out AI to craft personalised trailers for movies," *Dzone*, May 1, 2018.
12. Peter Burrows, "How the AI cloud could produce the richest companies ever," *MIT Technology Review*, March 22, 2018.
13. *Deloitte Global TMT Predictions* report, December 2018.
14. Ruchir Puri, "Deep learning as a service, IBM makes advanced AI more accessible for users everywhere," IBM News and Updates, March 20, 2018.
15. Nicholas Rossolillo, "Salesforce strengthens its AI capabilities with an \$800 purchase," *Motley Fool*, July 27, 2018.
16. Tamara Scott, "SAP vs. Oracle: Clash of the tier 1 ERP titans," TechnologyAdvice, July 5, 2018.
17. Nicolas Rapp and Brian O'Keefe, "These 100 companies are leading the way in AI," *Fortune*, January 8, 2018.
18. Jeff Loucks, Tom Davenport, and David Schatsky, *State of AI in the Enterprise, 2nd Edition*, Deloitte Insights, October 22, 2018.
19. Greg Williams, "Why China will win the global race for complete AI dominance," *Wired UK*, April 15, 2018.
20. Ian Sample, "It's able to create knowledge itself: Google unveils AI that learns on its own," *Guardian*, October 18, 2017.
21. Scott Rosenberg, "Why AI is still waiting for its ethics transplant," *Wired*, November 1, 2017.
22. Angela Chen, "How computers misunderstand the world," *Verge*, May 23, 2018.

23. Dimple Agarwal et al., *The workforce ecosystem: Managing beyond the enterprise*, Deloitte Insights, March 28, 2018.
24. Peter Evans-Greenwood, Harvey Lewis, and Jim Guszczka, "Reconstructing work: Automation, artificial intelligence, and the essential role of humans," *Deloitte Review* 21, July 31, 2017.
25. Deloitte Consulting, "CIOs can become chief insights officers," *WSJ CIO Journal*, November 6, 2017.
26. Mary Hall Gregg, Pfizer VP of business technology, research and development, interviewed September 28, 2018.
27. Ryan Steinberger, Pfizer VP of business technology, Global Business Intelligence and AI Center of Excellence, interviewed September 28, 2018.
28. Alex Benay, CIO, government of Canada, interviewed on October 16, 2018.
29. Sam Trendall, "D5 becomes D7 as Canada and Uruguay join global digital-government collective," *Public Technology*, February 23, 2018.
30. CIO Strategy Council, "About us," accessed November 12, 2018.
31. Subhash Kak, "Will robots take your job? Humans ignore the coming AI revolution at their peril," *NBC*, February 7, 2018.
32. Alain Dehaze, CEO of the Adecco Group, interviewed on October 31, 2018.
33. Adecco Group, "The Adecco Group spearheads the age of the freelancer with a new digital brand: YOSS," October 24, 2017.
34. Rajen Sheth, senior director of product management, Google Cloud Artificial Intelligence, interviewed on October 22, 2018.
35. Alison DeNisco Rayome, "91% of cybersecurity pros fear hackers will use AI to attack their company," *TechRepublic*, December 14, 2017.