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The democratisation of artificial intelligence

The Deloitte Consumer Review

2019

Deloitte Global's predictions

- In 2019, companies will accelerate their usage of cloud-based artificial intelligence (AI) software and services.
- Of the companies that adopt AI technology, 70% will obtain AI capabilities through cloud-based enterprise software, and 65% will create AI applications using cloud-based development services.
- By 2020, penetration rates of enterprise software with integrated AI and cloud-based AI platforms will reach an estimated 87% and 83% of all companies that use AI software, respectively. Cloud will drive more full-scale AI implementations, better return on investment (ROI) from AI and higher AI spending. Importantly, we will see the democratisation of AI capabilities and benefits that had previously been the preserve only of early adopters.

What is artificial intelligence?

AI consists of multiple technologies. Its foundation consists of machine learning and its more complex offspring, deep-learning neural networks. These technologies animate AI applications such as computer vision, natural language processing, and have the ability to harness huge troves of data to make accurate predictions and reveal hidden insights (see Figure 1).
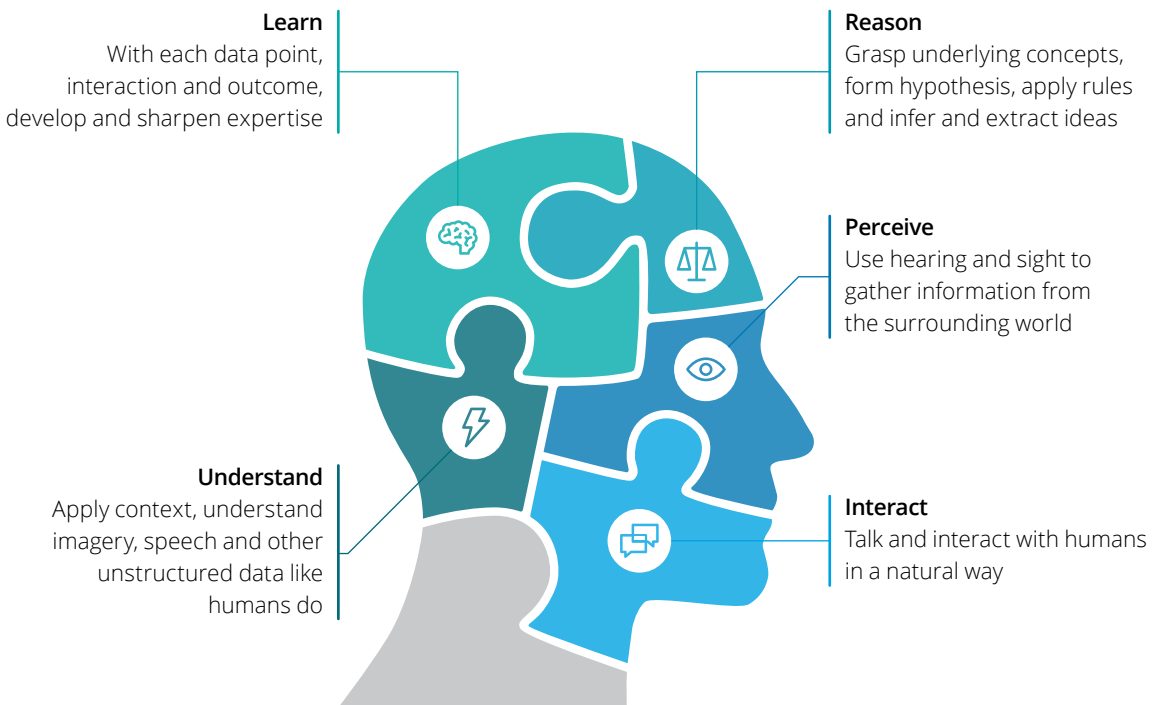
As a result, AI is one of several disruptive technologies that consumer products' companies can deploy to accelerate the process towards digital maturity. AI offers companies many ways to improve their operations, develop new offerings, and provide better customer service at a lower cost. As such, AI technologies can potentially strengthen a company's competitive advantage in the marketplace and enhance the customer experience.

There are three levels of AI application:

1. **Cognitive insights** – identify opportunities for growth, diversification and efficiencies using AI to search for patterns and analyse multiple data sources.

2. **Cognitive engagement** – use intelligent agents and avatars, such as chatbots, to deliver mass personalisation, and smarter and more relevant insights to improve end-user experience.

3. **Robotics and cognitive automation** – enable machines to replicate human actions and judgement with discrete robotics and cognitive technologies.

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Figure 1. AI illustrated

Learn
With each data point, interaction and outcome, develop and sharpen expertise

Reason
Grasp underlying concepts, form hypothesis, apply rules and infer and extract ideas

Perceive
Use hearing and sight to gather information from the surrounding world

Understand
Apply context, understand imagery, speech and other unstructured data like humans do

Interact
Talk and interact with humans in a natural way

Source: Deloitte Consulting

The democratisation of AI

The trouble with AI, however, is that, many companies have lacked the expertise and resources to take full advantage of it. Machine learning and deep learning typically require teams of AI experts, the access to large data sets, and specialised infrastructure and processing power. Companies that can deploy these assets then need to find the right use cases for applying AI, create customised solutions and scale them throughout the company. All of this requires a level of investment and sophistication that takes time to achieve, and is out of reach for many businesses.

As a result, it is the global 'tech giants' that have reaped the initial benefits of AI as they possess the required technical expertise, the strong IT infrastructure, and the deep pockets to acquire scarce and costly data science skills.[1] They have the resources to engage in bidding wars for increasingly expensive AI talent.[2] They have also invested billions in infrastructure, including massive data centres and specialised processors.

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These tech giants are using AI to create billion-dollar services and transform their operations. To develop their AI services, they are following familiar steps: first, find a solution to an internal challenge or opportunity, second perfect the solution at scale within the company and third launch a service that quickly attracts mass adoption. Hence, we see Amazon, Google, Microsoft and China's BATs (Baidu, Alibaba and Tencent) launching AI development platforms and stand-alone applications on the wider market based on their own experience of using AI.

The result is that these innovators are making it easier for more companies to benefit from AI technology even if they lack top technical talent, access to huge data sets and their own massive computing power. Through the cloud, companies wanting to benefit from AI, can access services that address these shortfalls – without having to make big upfront investments. In short, far more companies can now access AI applications courtesy of the cloud.

The most popular path to acquiring AI capabilities is also the easiest: enterprise software with integrated AI. Overwhelmingly, this software is cloud-based, either through public or private cloud deployments. Deloitte Global estimates that by 2020, about 87% of AI users will get some of their AI capabilities from enterprise software with integrated AI (see Figure 2).

Figure 2. Early adopters have their heads in the cloud

	2018		2019	2020
Cloud enterprise software + AI	**58%** Usage		**+12%** Growth estimate	**+17%** Growth estimate

	2018		2019	2020
Cloud AI development services	**50%** Usage		**+15%** Growth estimate	**+18%** Growth estimate

Source: Jeff Loucks, Tom Davenport, and David Schatsky, Deloitte state of AI in the enterprise, 2nd edition, Deloitte Insights, October 22, 2018.

Companies hoping to add AI capabilities can also tap into an array of single-purpose applications, such as chatbots, that can be deployed quickly and serve as the foundation for a digital business. Industry-specific AI apps are also emerging – often from startups. Reflektion uses deep learning to help e-commerce sites increase sales by presenting products that match individual customers' preferences.[3]

However, perhaps the biggest advantage of this easy path is also its biggest limitation – the use cases are strictly defined by the software. On the one hand, companies do not need to worry about whether a use case exists. The AI they buy has been developed to address specific – often critical – business functions. On the other hand, these solutions offer limited customisation, and the same capabilities are available to any company that uses the software. Companies that hope to gain a competitive advantage from AI will need to develop their own solutions.

That is where cloud-based AI development services come in. These include services for creating new AI applications, selecting the right models, and getting a head start on higher-order AI technologies such as natural language processing and computer vision.

Unlike enterprise software that has AI 'baked in', AI development services require companies to have in-house technical talent, such as AI programmers and data scientists. These services can help companies get the most out of their technical talent by providing access to tried-and-true models and by accelerating key processes. They allow companies with some technical AI expertise – but not enough to develop their own AI services, or to develop them fast enough – to create a higher volume of AI services, and at scale.

What is clear is that AI adoption will accelerate as more services come on the market – from pre-packaged enterprise AI solutions to development tools that can transform ordinary programmers into AI model builders.

AI has become ubiquitous, from making recommendations of what consumers should buy next online, to how a virtual assistant such as Amazon's Alexa and Apple's Siri respond to a question, to recognise who and what is in a photo, to spot spam emails, or to detect credit card fraud.

The evolution of AI

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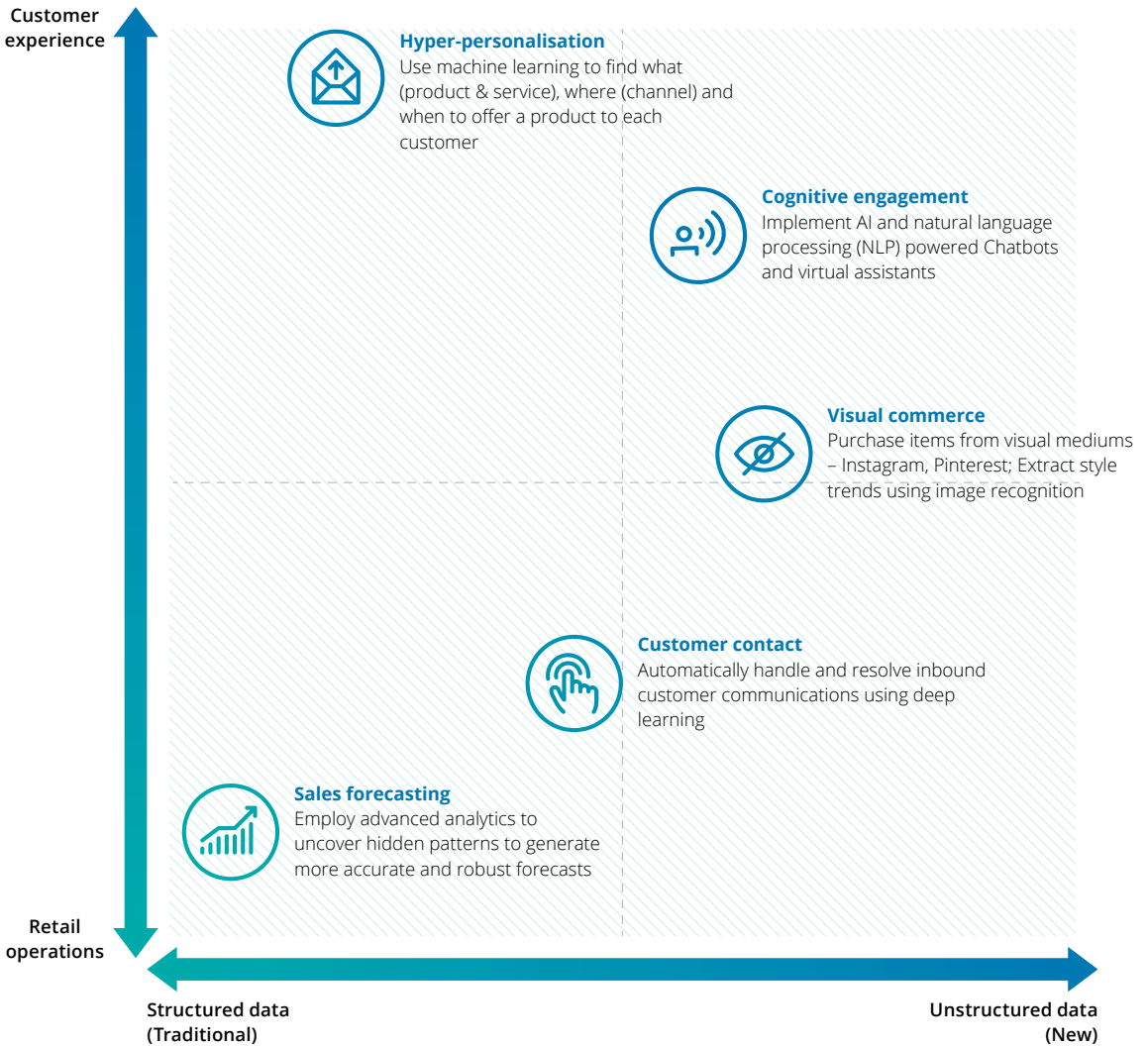
AI is split into two broad types: narrow AI and general AI. Narrow AI describes intelligent systems that were taught or have learned how to carry out specific tasks without being explicitly programmed. This type of AI is evident in the speech and language recognition of virtual assistants or in the recommendation engines that suggest products consumers might like based on their purchase history. There are large numbers of applications for narrow AI including, for example, responding to simple customer-service queries or co-ordinating with other intelligent systems to carry out tasks like booking a hotel at a suitable time and location. General AI is very different and comes closer to the intellect found in humans, a flexible form of intelligence capable of learning how to carry out vastly different tasks, anything from haircutting to building spreadsheets, or to reason about a wide variety of topics based on its accumulated experience.

The later type of more complex and advanced AI does not yet exist but poses many ethical questions in particular on how to develop AI in a manner beneficial to society as a whole. Developers agree that AI systems should remain transparent, their reasoning should be understood by human operators and those operators should have the ability to shut AI systems down if necessary. With the right checks and security in place, AI could transform societies for the better but research must be undertaken to maximise the benefits of AI while avoiding its potential pitfalls.[4]

The state of AI adoption among consumer-facing businesses

Consumer products organisations can use AI solutions to improve efficiencies, personalise offerings and improve the customer experience (see Figure 3).

Figure 3. AI, the enabler from retail operations to customer experience

Customer experience

Hyper-personalisation
Use machine learning to find what (product & service), where (channel) and when to offer a product to each customer

Cognitive engagement
Implement AI and natural language processing (NLP) powered Chatbots and virtual assistants

Visual commerce
Purchase items from visual mediums – Instagram, Pinterest; Extract style trends using image recognition

Customer contact
Automatically handle and resolve inbound customer communications using deep learning

Sales forecasting
Employ advanced analytics to uncover hidden patterns to generate more accurate and robust forecasts

Retail operations

Structured data
(Traditional)

Unstructured data
(New)

Source: Deloitte Consulting

Through the implementation of AI technologies, consumer-facing businesses can potentially benefit from:

- **Greater efficiencies** – automated processes that can help organisations realise greater efficiencies, improved outcomes and reduced costs.
- **Innovations** – AI-based product and service innovations made possible through AI-generated models of potential products and services.
- **Optimisation** – augmented decision-making enabled by advanced AI algorithms that quickly optimise scientific decision-making, allocate resources and efficiently scale operations.

Potential benefits for the consumer include:

- **Personalised products** – in the clothing, fashion and leisure space, products can be designed to suit a buyer's individual features, preferences and needs. Food and beverage companies can customise packaging by using digital printing technology.
- **Online product recommendations** – an algorithm-driven user interface can provide more accurate product recommendations based on assessments of consumers' buying patterns and product preferences, making the shopping experience more relevant, enjoyable and satisfying.
- **Timely service** – digital supply chain networks driven by AI have dramatically reduced turnaround, delivery and customer service times. For example, applying advanced neural networks for natural language processing to categorise customer emails and automatically route them to the correct customer service team.
- **AI driven marketing** – in addition, it may be advantageous to review product, marketing, advertising, and customer service strategies and tactics with the goal of integrating AI into these consumer-facing areas. Already customer engagement chatbots use speech-to-text capabilities along with natural language processing to handle simple customer queries.

Case study
Thread uses AI To tailor fashion recommendations
Most people would enjoy a personal stylist but cannot always afford it. UK-based fashion company Thread uses AI to provide personalised clothing recommendations for each customer. Customers take style quizzes to provide data about their personal style. Each week, customers receive personalised recommendations that they can vote up or down. Thread's AI algorithm uses that data to find patterns in what each customer likes and tailor its recommendations. The more data the company receives from a customer, the better the recommendations.[5]

Bottom line
As AI becomes more readily available and accessible, adoption will accelerate with more services coming on the market – from pre-packaged enterprise AI solutions to development tools that can transform an ordinary business into an AI operating organisation. AI is also transformational. At a time of deep digital disruption and acceleration, businesses that do not work out how to implement AI technologies will risk losing their competitive advantage to those who do. However, a clear vision of what the problem is will be required to structure an AI solution that is actionable and brings the current hype surrounding AI to a reality. Finally, as consumers become increasingly comfortable with AI-derived products and experiences, their preferences and behaviours may evolve, potentially leading them to expect AI experiences as the norm.

Endnotes

1. The global tech giants include Alphabet (Google), Alibaba, Amazon, Baidu, Facebook, Mi-crosoft, Netflix and Tencent. These are not the only companies to benefit from AI, but simply the ones that have had the most success to date in using AI to improve operations and increase revenue.

2. Cade Metz, "AI researchers are making more than $1 million, even at a nonprofit", *The New York Times*, April 19, 2018.

3. Jon Reed, "Retail and AI in 2018 – Can Reflektion help solve retail's personalization chal-lenges?", Diginomica, January 2, 2018.

4. https://blog.openai.com/introducing-openai/

5. https://www.marketingweek.com/2019/02/06/menswear-startup-thread-algorithm-fashion-tech/

Contacts

André Dennis
Deloitte Africa
Consumer Leader
Retail, Wholesale & Distribution Leader
adennis@deloitte.co.za

Rodger George
Deloitte Africa
Consumer Consulting Leader
rogeorge@deloitte.co.za

Mike Vincent
Deloitte Africa
Consumer Products Leader
mivincent@deloitte.co.za

Mark Joseph
Deloitte Africa
TMT Leader
marjoseph@deloitte.co.za

Valter Adão
Deloitte Africa
Chief Digital & Innovation Officer
vadao@deloitte.co.za

Deloitte.