Ready for the rise of the robots?

Technology, and the development of Artificial Intelligence (AI for short), may be the tools to solve many of the world's biggest problems including pollution, climate change and hunger. Of course, AI has its detractors, but few doubt its long-term significance. Machine learning – the ability of computers to "learn" without being programmed – has implications for economies and industries across the globe and could fundamentally reshape society.

Having been fertile territory for science fiction writers for many years, increasing computational power and the broader availability of data on which to build algorithms has helped AI build a broader relevance and greater practical use. The cost of a hard drive has fallen dramatically from $200,000 per gigabyte in the 1980s to $0.05 in the 2010s,[1] while the rise of smart devices – the 'Internet of Things' – has allowed the collection of vast data sets, enabling computers to build patterns.

INSIGHTS

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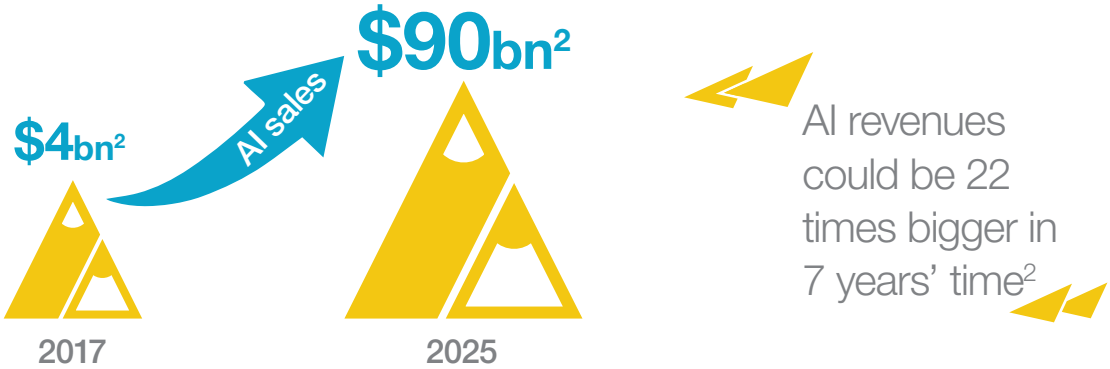
Disruption ahead

AI is already in our homes, with millions of households reverberating to shouts of "Alexa" or, more likely, "Alexa off", and "Hey Siri"; in our cars, with crash prevention technology and intelligent maps. Robots are being used in 'smart' warehouses, in medicine and farming. Its potential applications are vast. While the more traditional areas of robotics and information technology are currently leading the charge for change, there's little doubt AI is spreading to industries as diverse as automotives and energy, healthcare, agriculture, retail and law.

It will become a disruptive general purpose technology: a new utility capable of transforming every aspect of the economy and society. In our view, 2017 was ground zero for mainstream AI as the industry generated around $4bn in revenues. Some expect that to be $90bn, or around 22 times bigger, by the end of 2025.[2]



[1]Source: SG Cross Asset Research/Thematic; The Rise of the Robots, Martin Ford.
[2]Source: Statista, 2018. Estimated revenue is a forecast only and is not a reliable indicator of future results.

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AI explained

There are two main forms of AI: narrow AI (or weak AI), where a computer programme is able to fulfil a specialised task without being given precise step-by-step directions. For the most part, this is the type of AI we encounter today. General AI (or strong AI), where a computer programme matches or outperforms humans at any intellectual task, including broad cognitive reasoning, remains science fiction for now.

There are huge potential economic benefits to the adoption of AI. It offers a potential solution to some of our most pressing global problems, but it also brings disruptions and threats: there is a clear impact on blue-collar, manual jobs but white-collar jobs may also be affected as computers learn languages, analyse medical scans or read complex legal documents. One of the primary challenges in the coming decades will be to ensure that the benefits of advancing AI and robotics outweigh the risks.

Blazing a trail

While AI's reach is growing, its adoption by a number of trailblazers outside of the traditional industrials and tech sectors should help it become very significant indeed. There is little doubt AI development will lead to new breakthroughs in science, medicine, energy and transportation - and these advances could happen sooner than you think.

The use of AI could also change the entire consumer chain, potentially resulting in several disruptions to consumption via:

> These advances could happen sooner than you think

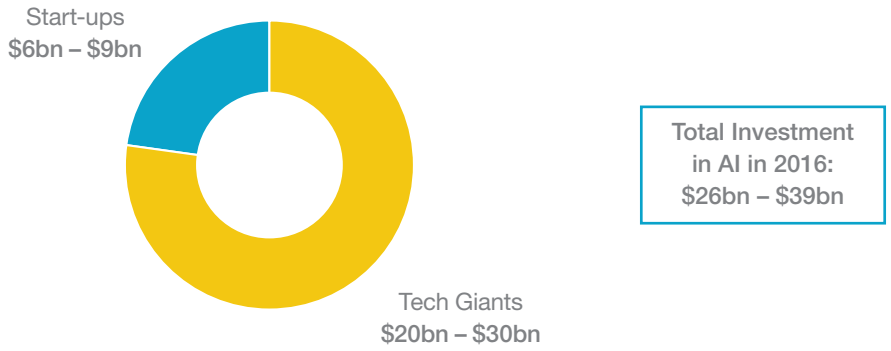
- The sharing economy, which will develop further thanks to peer-to-peer networks. New models are now emerging, as illustrated by unlisted company Airbnb
- New types of retail stores, which are currently disrupting the retail economy, as illustrated by the launch of Amazon's cashierless store (free of human beings), thanks to the Walk Out Technology developed by the tech group
- New payment solutions, with fintech challenging financial institutions and crypto currencies challenging the status quo
- Personalised consumption, which will increase as more and more customers demand unique products

Accountancy group PwC estimates that AI could add $15.7tn to the global economy, roughly 21% of global GDP in 2016 ($75.5tn), or 26 times the total worth of the ten wealthiest billionaires according to Forbes ($612.5bn). It really could be the next global economic revolution.

The tech titans are wise to this, and AI already forms an important part of the development budget of Alphabet (owner of Google), Facebook, Amazon and others. The McKinsey Global Institute estimates they spent £20-30bn on AI in 2016, representing 77% of the total AI investment amount, and this is accelerating. Helped by their massive resources, they've been serially acquiring the most promising start-ups in the field. According to CB Insight, 250 companies working on AI have been bought since 2012 – and the trend seems to be accelerating. None of the titans can afford to be seen as obsolete.

Amazon Go is a new kind of store with no checkout required. Customers can just walk out with no checkout or line. According to Amazon, the store concept uses technology such as computer vision, deep learning algorithms, and sensor fusion to automate much of the purchase, checkout, and payment process.

Big technology companies represent 77% of total investment in AI (2016)



Source: SG Cross Asset Research/Thematic, McKinsey & Company

Overcoming key challenges

Some believe robotics and AI could deepen inequality by putting certain jobs at risk. An analysis by Deloitte showed the cost of a robot is approximately 10% of the cost of a typical worker, for better efficiency. There is also a security threat, given autonomous systems such as self-driving vehicles are vulnerable to cyber attacks or hacking as are critical infrastructure systems. None of these issues are insurmountable however.

> Finding solutions to these issues will create dramatic new opportunities for innovation, employment and investment.

Transparency is another potential problem. Machines that can learn typically operate as "black boxes". This means even those who create these systems cannot necessarily understand how they arrive at their conclusions. This can be an issue in areas like regulation, criminal law or employment decisions where a fair, transparent process is essential. For all that, research is underway to build systems that can explain how they reach conclusions.

In our view, finding solutions to these issues will create dramatic new opportunities for innovation, employment and investment.

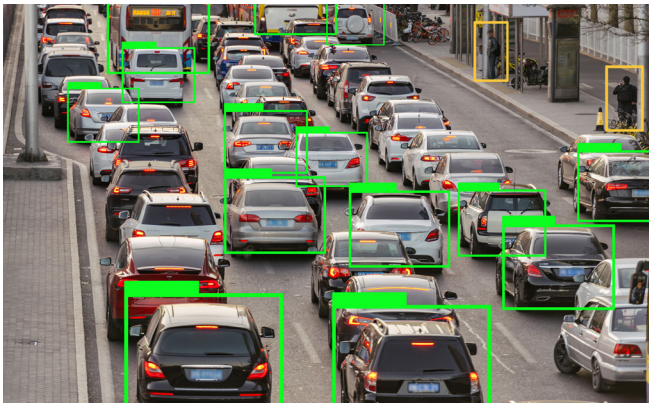
Investing in the future, for your future

Given the speed of development of new technologies and recent advances, we can assume AI will be adopted by society very quickly. This is no longer a dream of electric sheep; it is a reality and is very likely to shape the future.

Did you know?

The CFA Institute is updating its curriculum with new readings on fintech. From June 2019, CFA candidates will be tested on topics such as big data, artificial intelligence and machine learning.

AI has already made enormous progress in the automotive sector, but there's more to come – and the benefits are numerous. Driving should become far more efficient with fewer traffic jams, more car-sharing, and smarter routing. Alibaba for example has made significant advances in this area with its "City Brain" project in Hangzhou, China. Self-driving cars are more likely to be electric, which helps with emissions, and they don't drive drunk, angry, or while using their mobile phones. Driverless cars thus have the potential to transform the way cities are organised and bring real environmental benefits.



Using a cloud-based system, Alibaba's "City Brain" technology stores and processes data about the movements of everyone in the city. AI algorithms can then help reduce traffic jams, and better respond to accidents and crimes.

Meanwhile, Google has already used DeepMind's AI technology to intelligently manage power within cloud computing facilities, resulting in major improvements in energy efficiency, while technology like IBM Watson – originally built to play the quiz Jeopardy – now acts as a steward for the environment by helping to manage resources in the agricultural sector. For example, data on soil quality and weather patterns can help farmers achieve the best crop yields or reduce the amount of water vineyards consume.

The revolution starts here

According to Accenture, AI could also address 20% of the unmet demand for care and aftercare, mostly by filling vacant positions that result from a shortage of clinicians. As an example, machines could collect data on people's symptoms and health markers upstream and suggest suitable treatments or offer an appointment with a specific doctor. With all the data it can collect, AI could ultimately improve diagnoses and thus outcomes for patients. It could also meaningfully reduce healthcare costs and widen access to care.

These are just a few examples, but one thing is clear. AI has come a long way from creating the world's best games players and has much further to go yet. Its effects will be felt far and wide, well beyond the traditional areas like industrials or tech. This is robo 2.0. The revolution starts here.

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