How artificial intelligence and data add value to businesses

McKinsey Global Institute March 2018

Artificial intelligence will transform many companies and create completely new types of businesses. The cofounder of Coursera, AI Fund, and Landing.ai shares how businesses can benefit.

Artificial intelligence (AI) is at the cutting edge of innovation. But how do companies find the expertise necessary to utilize it, and then take it to market? In this video, recorded at the Aspen Ideas Festival in June, Andrew Ng, cofounder of Coursera, AI Fund, and Landing.ai, discusses the difference between an AI-enabled business versus a true AI company, and how businesses can organize, hire, and make use of AI to add value.

Interview transcript

How can AI create value for business right now?

Almost all the economic value created by AI is through one type of technology, which learns inputs, outputs, or maybe A-to-B mappings, such as you might input an email, the output telling you it's spam or not. For speech recognition, you input an audio clip and output a text transcript. For machine translation, input an English sentence, output a Chinese sentence. For a self-driving car, input a picture of what's in front of your car and your radar readings and output the position of the other cars.

What has changed about AI in recent years?

The technical ideas have, for the most part, been around for many decades, but we have only recently brought enough computational power and data to this form of AI to make it work really well. And this type of A-to-B mapping, the technical term is supervised learning. This one idea by itself is enough to transform multiple industries.

What is the impact of AI on automation?

Think automation on steroids. Until recently, there were some things that we could automate with computers. Thanks to the recent rise of AI, especially supervised learning, machine learning, the set of things we know how to automate is much bigger.

What is the next set of AI technologies that are around the corner?

In the AI research literature, we often talk about unsupervised learning, which roughly means letting the AI look around the world and figure things out by itself.

We sometimes talk about transfer learning, where you learn to do one thing and use that knowledge to do something else.

Sometimes, we talk about reinforcement learning, which is a little bit like how you might train a puppy. The dog does something good, and you go, "Good dog." It does something bad, and you go, "Bad dog." And over time, the dog figures out what it did well, what it did poorly, and hopefully does more of the good things.

I would say out of all of these categories, supervised learning is the one that's creating clear value. Some of these other categories I feel like the algorithms and the thinking and how they take it to market are still in the early stage.

What does it mean to become an AI-enabled company?

I think AI will bring about a transformation of a lot of companies and even the rise of new types of companies. Today, we have things called Internet companies. The fundamental thing that defines an Internet company is not whether you operate a website. It's whether you have architected your whole company to leverage the new capabilities the Internet gives you.

With the rise of AI, we're still figuring out how to architect our companies to leverage AI capabilities. Just as building a website doesn't make you an Internet company, sprinkling on a little bit of machine learning doesn't make you an AI company.

How is AI affecting how companies organize themselves?

Our old job descriptions—engineer, product manager, designer—are breaking down. For example, if you look at any mobile app, there was probably a product manager that drew a simplified diagram called a wireframe to design that app. But if you look at the self-driving car, you don't need a wireframe for a self-driving car. That just doesn't make as much sense. So we're inventing brand-new processes and work flows for the AI era as well.

How can a company find and develop AI talent?

Today, AI talent is scarce, and you just can't find enough AI talent and engineers. Another thing that may be even more scarce is the skill to take the AI technology and figure out how to take it to market. For a lot of the companies, the best hope might be to try to hire one strong

AI leader and then build a centralized AI organization that you can then matrix into your various business units.

One other thing I've seen that's really effective at a few organizations is to have executives send a very clear message that employee development is valued.

Thanks to the rise of online education, I think that AI talent is disseminating very rapidly. There are tons of resources on the Internet, but to use resources like that to level up your whole employee base, that would make your whole organization more effective at maybe working with your centralized AI organization.

What's the relationship between digitization and AI?

In a lot of industries, I think we'll see a few waves. The first wave is the digitization wave, where we take things that were analog, or just not in the computer, and digitize it. The digitization revolution in a lot of industries comes first and creates digital data.

After that comes some data science, where you start to get more insights, and then also AI, because it's only after you have the digital data that AI is very efficient in coming in to eat that data to create value.

How do AI companies think about data strategy and competition?

I think that true AI organizations are much more sophisticated, much more strategic in data acquisition. So, for example, I've done things like launch a product in one geography to acquire data to then take to the next geography. But then we don't monetize any of this.

If you can just have enough data to launch a product that's good enough, that allows you to enter a positive feedback loop in which your users help you generate more data. More data makes the product even better, so you have more users. And that positive feedback loop allows you to accumulate data, so that maybe after a few years you could have a pretty defensible business.

For example, today the large web-search engines have an incredibly valuable data asset of what web pages people click on when they search on certain things. That data asset is incredibly valuable for building a good web-search engine.

We can take all this data and monetize it somewhere totally different. The sophisticated AI organizations are definitely playing these multiyear chess games, doing multiyear strategic planning in order to play out data acquisition.

Can only the biggest technology companies compete on the basis of data?

There's so much data in the world that I don't think any one company today has a reasonable strategy for acquiring the majority of valuable data. And in fact, data tends to be most valuable in the vertical in which you collected it or are applying it.

There are plenty of opportunities, both for moderate-size teams and larger corporations, as well as for even small start-ups, to use AI to attack new verticals.

How do AI companies organize data?

AI companies tend to organize the data better. So putting data in a centralized data warehouse makes it more efficient for engineers or software to exploit that data. Instead of federated or distributed data sets, we like to bring it together because it's like gunpowder. You put a lot into it to make a big bang. ☐

Andrew Ng is the cofounder of Coursera, AI Fund, and Landing.ai.