

## Remarks for the Opening of the 2019 AI and the Future of Work Symposium

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Welcome, everyone! I'm thrilled to be here with you to discuss Artificial Intelligence and the Work of the Future.

This is the third year we've held this event. Even in that short time, we've seen major advances in technology, and the impact it's having on our lives.

Whether you came from near or far, you probably experienced some of those impacts along the way.

If you flew in through Pittsburgh, perhaps you used the new AI-based system from startup Zensors to check the length of the security lines before heading to the airport or deciding to grab a last-minute coffee<sup>1</sup>.

No matter where you flew from, autopilot helped ensure you got here safely. AI is now so effective in aiding pilots that Airbus is even exploring moving to a single-pilot flight model over the next decade.<sup>2</sup>

And it's not just the in-flight experience that's benefitting. New automated and AI-augmented systems will soon make lost baggage a thing of the past.<sup>3</sup>

If you braved Boston traffic, you may have wished that automated cars were a *little bit* closer to available—though you benefitted from the smarter designs and lower prices enabled by human-bot collaboration on the production lines.

If you grabbed a quick burger at McDonald's, perhaps you saw one of their new augmented menus in the drive-through. These digital signs market different food based on the time of day, the weather, popularity of different items, and even the length of the wait.<sup>4</sup>

After you finally picked up a hotel key--all ready for you since you'd checked in using the app--maybe you settled down to watch one of the movies that your streaming system of choice knew that you'd enjoy.

A long day got a little easier thanks to AI. And these are just the examples I came up with knowing nothing about your specific job! Dig into every industry, every job type, and you'll find dozens of ways that AI is changing the nature of your work.

Consider manufacturing. We've all seen photos of robots on manufacturing floors. But what about AI? With new design and simulation tools product designs can be validated faster. Sensors on manufacturing lines can feed data into real-time systems that can adjust the machines to avoid minimize defects. Robots can manage dangerous work and help workers avoid safety risks. Computational design and fabrication is reducing the time to new products and enabling customization.

But the potential changes are so much bigger than marginal improvements. Tomorrow, we may be working with entirely new molecules and materials. Businesses like Cambridge-based Kebotix are using AI and robotics to explore, discover, and produce new materials that can help us address massive challenges like climate change and water pollution.<sup>5</sup>

With all this potential, it's no surprise that the McKinsey Global Institute estimates that the United States could boost annual manufacturing value added by up to \$530 billion over current trends by 2025—and add up to 2.4 million jobs.<sup>6</sup>

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<sup>1</sup> <https://www.pnewswire.com/news-releases/airports-are-using-artificial-intelligence-ai-to-take-some-stress-out-of-holiday-travel-300948434.html>

<sup>2</sup> <https://www.livemint.com/companies/news/airbus-eyes-single-pilot-aircraft-with-ai-assistance-11573820667174.html>

<sup>3</sup> <https://www.internationalairportreview.com/news/67527/ai-sita-baggage/>

<sup>4</sup> <https://www.nytimes.com/2019/10/22/business/mcdonalds-tech-artificial-intelligence-machine-learning-fast-food.html>

<sup>5</sup> <https://www.businesswire.com/news/home/20181107005913/en/Harvard-Scientists-Launch-Breakthrough-AI-Robotics-Tech>

<sup>6</sup> <https://www.mckinsey.com/featured-insights/americas/making-it-in-america-revitalizing-us-manufacturing>

I emphasize the new jobs because that, of course, is the part that everyone is worried about.

If you read the news, you know that we're facing the end of work. We'll *all* be unemployed within the next 10 years, as a combination of robots and artificial intelligence conspire to take away our jobs. Sure, profits will grow, as will GDP—but none of us will reap the rewards.

This may sound alarmist—and I think it probably is—but this fear is very real for most workers. A 2018 study by the Pew Research Center found that between 65 and 90% of those surveyed in advanced economies believe that robots and computers will probably or definitely take over many jobs done by humans. Less than a third believed that new, better-paying jobs will emerge.<sup>7</sup>

So who is right? The economists who predict greater productivity and new jobs? The technologists who dream of creating better lives? Or the factory line workers who worry about unemployment?

The answer is probably “all of them.”

New technology will make our lives easier in many ways, automating menial tasks and giving us time for meaningful work and leisure. Many of us may live healthier, longer, and more enjoyable lives.

Gains in productivity will boost profits and create new, high-paying jobs across many sectors and parts of the world. In fact, the World Economic Forum predicts the creation of 133 million new jobs globally over the next five years.<sup>8</sup>

All of that is possible, even likely—and YET it's also true that some of the work done by humans today will be automated, leading to the loss of existing jobs. Research from McKinsey estimates that 45% of the activities individuals are paid to perform today can be automated by adapting currently demonstrated technologies. Add all those activities up and they represent \$2 trillion in annual wages.<sup>9</sup>

That doesn't mean that 45% of jobs will be lost. We don't automate 'jobs', we automate tasks. But as more of a worker's tasks are automated, their job will either be redefined—to focus on work that machines can't do—or ultimately replaced.

So it's both true that new jobs will be created and many existing jobs will be lost. Simple math suggests that as long as the first number is bigger, we should be OK.

But it's *not* that simple. People don't move easily from one type of job into another. The skills required for those new, high wage jobs may require years of training.

This isn't the first time technology has caused a major restructuring of the workforce. But unlike past eras, digital technology is causing massive polarization in the labor market.

Middle-skill workers will absorb the biggest impacts. Many of these jobs are made up of routine codifiable tasks. Think of jobs in office and administrative support, production and repair occupations, or even sales. As AI continues to improve, it will be able to perform more and more of the tasks currently done by these jobs.

The downsides of AI may also be felt more heavily in the developing world. As the economist Jeffrey Sachs puts it, “developed countries may end up producing at home through automation the goods they used to import from developing countries. The result could be a boost of income for developed countries and deeper impoverishment for developing countries.”

But while advances in technology may be inevitable, their impacts on our workforce are not. The end of this story depends on the decisions made by government, corporations, educational institutions—all the groups represented here today.

Together, we get to decide what future AI will bring—and I believe with the right investments, it can be a better ending for everyone.

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<sup>7</sup> MIT Work of the Future Report, p.9.

<sup>8</sup> [http://www3.weforum.org/docs/WEF\\_Future\\_of\\_Jobs\\_2018.pdf](http://www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf)

<sup>9</sup> <https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/four-fundamentals-of-workplace-automation>

Some of those decisions will shape the technology itself.

Our best path forward requires humans and machines to work together to make better decisions. Machines offer speed, but people offer empathy and wisdom.

We are working hard to advance the science and engineering of AI and we are making progress. But today's systems remain black boxes—and therefore lack trustworthiness and robustness. We need policies to ensure consumer confidence in how those decisions were made, the fairness of the process, and the quality of the data used to train the system.

Human-machine collaboration requires better machines AND humans who know how to leverage those machines. That won't happen without a significant investment in education.

I've long believed that digital literacy should be taught alongside the core curriculum in all public schools.

If you visit our wealthiest school districts, you'll find new computers and summer coding camps. But travel a few miles down the road and you'll find school districts lacking the resources to teach basic digital literacy.

We know that innovation benefits from diversity, yet we don't invest in giving ALL our students a chance at these high paying jobs. If we want to prevent further workforce polarization, that needs to change.

But it's not enough to invest in training the workforce of tomorrow. We need to get serious about reskilling the workforce of today.

That doesn't have to mean a four-year college degree. In the United States, we have more than 1,200 community colleges providing affordable training for about six million students. In the future, opportunities exist to deploy innovative programs through these community colleges to support students with services that can speed up the time to degree and boost graduation rates.

We also have opportunities to connect these community colleges with employers to design skill programs that are responsive to market demands.<sup>10</sup> We've already seen some examples of this—Google partnering with 25 community colleges to offer students its IT Support Professional Certificate, or Northern Virginia Community College partnering with Amazon to help students learn about cloud computing in its information systems technology track.<sup>11</sup>

These opportunities don't have to be restricted to traditional education. Innovations in online education will make training more affordable and accessible to workers in many different sectors. And work-based learning programs like co-ops and apprenticeships are already thriving in many European countries. These programs combine classroom and work-based learning to prepare workers for good-paying jobs.

As we pursue this retraining, we'll need to focus on areas where machines can't become an easy substitute. Research done at LinkedIn found that 57% of senior leaders believe that soft skills are more important than hard skills. Many companies are looking for people with creativity, persuasion, and collaboration skills.<sup>12</sup>

No matter how advanced AI becomes, these are the types of areas where it will struggle to replace people. Let's make sure that these skills find a central place in our retraining efforts.

Retraining a large percentage of our workforce will require a sizable investment, larger in scale than anything we've done in generations. I believe this investment is worth it—but I also believe that we're charting new waters. Our understanding of how adults learn—especially when interfacing with technology—is still relatively immature.

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<sup>10</sup> MIT Work of the Future Report, p.37.

<sup>11</sup> <https://edtechmagazine.com/higher/article/2018/07/major-companies-partner-colleges-education-opportunities-emerging-tech>

<sup>12</sup> <https://learning.linkedin.com/blog/top-skills/the-skills-companies-need-most-in-2019--and-how-to-learn-them>

We'll need to hold retraining initiatives to a high standard of outcomes, paying attention to what works—and what doesn't—and use that to help direct the investments of the future.

At MIT, we're already beginning this work by building a framework to bridge the science of learning to actual workplace adult learning. This kind of research will be vital to ensure that these large investments are being made in the best possible places.

At last year's event, I described myself as a technology optimist. That's still true. But that optimism doesn't mean I'm blind to the possible downsides of technology.

For me, optimism means that I see all the possibilities—and believe that our actions will decide which of those paths we go down.

Technology has already improved our lives in so many ways, and AI opens the doors to endless more opportunities. If we make the right choices and the right investments, we can ensure that those benefits get distributed widely across our workforce and across our globe

We have a lot of work ahead of us. I'm looking forward to hearing your thoughts on how we can do it together over the rest of today.

Today, we have an amazing agenda full of brilliant speakers covering topics like integrating new technology into work, what inclusive entrepreneurship looks like, strategies to promote human development in this new world, and ways to shape policy and practice to ensure that technological innovations benefit society at large. Along the way, we'll share some insights from the Work of the Future report recently released by our own MIT Task Force.

Then tomorrow, we'll try something new—what we're calling our Unconference Workshop. Last year we heard from participants that they wanted to play a more active role in co-creating solutions—so we built tomorrow to give you a chance to drive the agenda and share your own thoughts.

I'm looking forward to getting started. I hope you are, too!