

# How can business leaders, policy makers, and individuals prepare today for the jobs of tomorrow?

April 2018

Zoë Baird and Tim O'Reilly share their perspectives on the disruptive impact that automation and artificial intelligence will have on society, and their advice for what we need to do today to smooth the transition.

In the New World of Work podcast, experts from the McKinsey Global Institute (MGI) have explored key insights into the anticipated impact of automation and artificial intelligence (AI) technology, based on recent research on the future of work.

What do other experts have to say? We sat down with Zoë Baird, president and CEO of the Markle Foundation, and Tim O'Reilly, founder and CEO of O'Reilly Media, at an event in San Francisco collaboration with the Churchill Club to share their thoughts on the new world of work. They address key questions: How do we retrain the workforce? What role does government play in the transition? How are businesses preparing for the shift? How do we ensure an equitable future of work? And, should we consider universal basic income?

**Peter Gumbel:** Hello and welcome to our latest podcast in our series on the new world of work. Today we're going to be listening to a conversation between Michael Chui, Zoë Baird, and Tim O'Reilly of O'Reilly media. The conversation took place at an event in San Francisco in collaboration with the Churchill Club, where the panelists discussed a new report by MGI on the future of work, called *Jobs lost, jobs gained: Workforce transitions in a time of automation*.

**Michael Chui:** Many of us have seen the worrying headlines about the "robot job apocalypse." And they're scary headlines because you hear things like, "We're not going to have any jobs." Did anybody see the robot that did the back flip? You see that and think, "Gosh, what *can't* these machines do?"

That can be scary. I don't know about you, but when I'm scared I return to my roots and start doing some analysis. At the McKinsey Global Institute, we have this tic where we like to analyze things that scare us.

In 2017, we published a report looking at the potential for automation across the entire workforce. We looked at 800 occupations, as well as all the constituent activities within each occupation. We scored each of those activities against 18 different capabilities which could potentially be automated. We looked at over 2,000 different detailed work activities, across almost 50 countries, and tried to understand the potential for automation going forward. And it is considerable.

If you look ahead to 2030, there's a wide range of scenarios that may happen. Which scenario plays out will vary depending on the choices we make as citizens, business leaders, and workers. We don't view this as something that you simply observe. This isn't like astronomy; this is more like chess.

But, that said, if you look out to 2030, in the top-line scenario, up to 30 percent of the work activities that we currently do could potentially be done by machines. In a midpoint automation scenario, that number is closer to 15 percent.

It's a very different scenario, depending on the country. In countries that have lower wage rates, we also expect lower automation rates, because the business case for automation is less compelling. In countries such as the United States, Germany, or Japan, we expect the automation rate to be quite a bit higher. In the US, we might be looking at an automation rate in the 20 percent range.

That does bring up the question: Will there be enough work for people? We're not in the business of predicting the future, but we did want to analyze this in detail and ask ourselves: Can we imagine scenarios in which there is enough work to offset the work that would potentially be automated by all these brilliant machines?

Consequently, we looked at several different drivers of work. Our guest, Tim O'Reilly, often talks about the work that needs to be done and the work that needs doing. If you look at several trends that are going to occur in the world, or potentially could occur in the world, one is rising prosperity. Another billion people are entering the consuming class, particularly in developing markets, over the next ten years. They'll all need more media, they'll all need more cars, they'll need more apparel. That will drive additional work. Aging, which we worry about being a productivity drag, will also generate more work. People will need more healthcare.

We also talk about increasing investment in infrastructure, in buildings. Again, we know that's necessary in developing markets and developed markets. And there are some other things that we think about, too, such as the development and deployment of technology. If you have more women in the workforce, you might start to have a bunch of what we call unpaid work at home, whether it's childcare or cleaning, cooking, et cetera, that might be part of the market going forward and that could generate additional work. When you compare those things, that's just a limited number of things.

And so on, with other potential scenarios. We always know that there are new jobs and activities being created that could potentially generate more labor demand. If you look at all

those, there are scenarios where there is enough work for people to do, even net of the things that might be automated.

That said, a different question is, can we get people from doing what they are doing now to the jobs of the future? And we think that's a huge challenge.

In our midpoint scenario around the world, 75 million people might need to change occupational categories. But that could range up to 375 million depending on the pace of automation around the world (exhibit). Different scenarios could happen, but that's still a huge challenge. And, quite frankly, we haven't necessarily solved for how to retrain this many people in the middle of their careers.

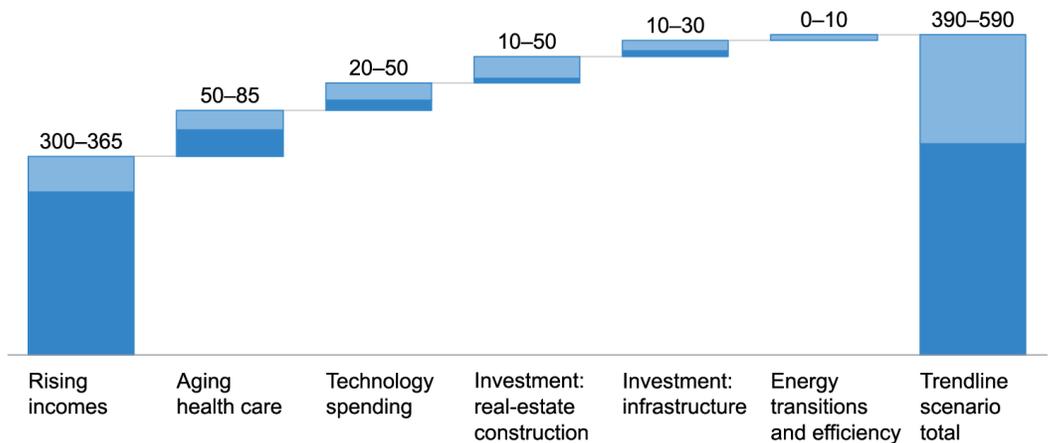
**Exhibit**

**Rising consumer incomes are the largest source of job creation among our seven catalysts.**

**Potential jobs created from seven catalysts of labor demand, midpoint automation, 2016–30<sup>1</sup>**

Million FTEs<sup>2</sup>, ranged low–high

**Trendline scenario**



<sup>1</sup> Some occupational data projected into 2016 baseline from latest available 2014 data.

<sup>2</sup> Full-time equivalents.

Source: McKinsey Global Institute analysis

Another question we asked is, what about incomes and income inequality? We can't predict what everyone's going to make, but if you look at the net of the trends that we looked at, we've seen a hollowing of the middle-wage jobs. The mid-wage occupations are under the most pressure. Given the things that we've modeled, that's another set of challenges to think about.

And with that, let's speak with these smart people. Tim, let me start with you. You've mentioned before that there's no shortage of things that need doing. Could you talk about what you mean by work that needs doing?

**Tim O'Reilly:** First of all, I do really want to point everybody to one of your graphs in here, I think is Exhibit 14, which just jumped out at me, where it says, "Rising consumer incomes are the largest source of job creation."

That indicates [that] if people have money, they will spend it. Therefore, we need to make sure that we get money into the hands of ordinary people, not into the hands of just a few people. In some sense, inequality and jobs are very tightly connected because of the following two main drivers of jobs.

And the first one is just the stuff that needs doing. When people say there's not going to be enough jobs, I respond, "There's plenty of work." Just look around. There's so much that needs doing and we should ask ourselves: Why aren't we doing it? What are the systemic obstacles?

We're going to have to deal with climate change. We're going to be rebuilding every few years until we figure out that we need to start moving people. We already have millions of displaced people in the world. We're going to have a lot more of them. We're going to need to build whole new cities. There's a great deal of work involved in the energy transition dealing with climate change.

Or, another example is dealing with the transition in our economy as our populations age. There is a possibility to create a disruptive transformation of our healthcare industry from the old factory model, where you put all the big, heavy equipment in one place, to one where we can do a diagnosis with a smartphone. Reinventing the economy to solve real problems for real people will produce plenty of work.

The second thing is related to that rising income graph. If you look at the history of every technical innovation, we created new jobs because, as we made one thing into a commodity, we found a way to make that commodity valuable again. We made more cloth and we invented fashion, so that people bought new kinds of clothes and bought clothes more frequently. We didn't say, "OK, you've got your one suit at home, we're done."

We didn't say, "We only need two percent of the population to produce food, there's no more food industry. All get your oatmeal." In a rich society, if you give people money, they say, "Entertain me with food. Make it really special and good."

And we sell ideas. Food is food plus ideas. For example, this isn't just coffee. It's coffee from this amazing grower in Sri Lanka, roasted by this amazing roaster in Emeryville, and it's worth more than any other coffee because it's unique and special.

We've decommodified our commodities with this creative economy, which is what people will do if they have money to spend. There is no reason whatsoever for us to run out of work, except for the fact that we've failed to circulate the fruits of productivity well enough. There's plenty to go around; it's just not going around.

**Michael Chui:** Zoë, let me bring you in. In some of our research, what we have generally found is the skills and/or education necessary for the new jobs going forward are going to be

higher than they are for the jobs of today. At the Markle Foundation, you're studying as well as implementing this idea of trying to prepare people for the next jobs. Can you talk a little bit about what you're seeing there?

**Zoë Baird:** Sure. Let me step back from the vision and the data to talk about the people. We all know that people love their smartphones and almost everybody has one now, no matter what your income level. In fact, Jeff Weiner has an amazing quote about somebody hired at LinkedIn who created an app for homeless people to better find homeless shelters. That's an incredible statement. And people stream video. They stream music.

But at the same time, people feel completely disenfranchised from the economic benefit of these tools. The gaps between people's feeling of inclusion in the digital economy and their feeling of being left behind is growing. It's wide.

There was a recent Pew poll where 76 percent of Americans said that they expect that automation is going to drive that gap even wider. And people are deeply concerned about it.

There's a huge disruption. There's a huge disconnect between people's enthusiasm for technology and their feeling of benefiting from it. We've been telling people for decades, "Go to college, get a four-year degree, and you'll succeed." And 70 percent of Americans do not have a BA and that has been true for decades. The singular message we've had for people hasn't worked.

At the same time, we did a poll in 2016 where we showed that 87 percent of Americans believe that they need lifelong skills training to succeed. But they look out at the universe of what's available to them and they see that most education ends at 18 or 22.

They don't think financial aid is available to them. They go to an unemployment office or workforce center and the people there don't know what digital-economy jobs look like. We are at an inflection point where the people in this community have a tremendous opportunity to contribute and it's a very exciting business model as well.

And that is to create the second wave of digital disruption of jobs to use the very same technologies, automation, and AI to transform the labor market so it works for people. So just briefly, a couple of examples of what that would look like. we've started to do some of this with LinkedIn in an effort called Skillful.

If you take an employer and enable them to identify the skills they need in a job rather than looking for the bachelor's degree, that opens up a much larger pool of potential applicants with potentially more targeted skills to fill those jobs and makes more people eligible for the jobs that exist. There are six million unfilled jobs in this country.

The potential for creating businesses that enable people to compete based on skills rather than the increase of the use of the bachelor's degree is tremendous. And we need all kinds of tools and apps and innovations coming out of this community to enable that to happen.

We see now that we're going in the opposite direction. For an entry-level computer-systems administrator job, 45 percent of people who hold those jobs have a bachelor's degree, but 75 percent of job postings call for a bachelor's degree. Employers rule out 75 percent of Americans even being considered for those jobs.

Similarly, we need data and tools for educators to train people more rapidly in the skills that are needed. We need social media to show people what these jobs look like so they can envision themselves in them. And there's just a tremendously rich potential. But it is an ambition we should hold to create a second wave of digital disruption of jobs.

**Michael Chui:** Can we just spend a minute just talking about what Skillful is?

**Zoë Baird:** Skillful started in Colorado. We went live in 2016. And already we have over 100 businesses using the tools that we've developed. And McKinsey was a significant part of this in revealing the skills that are needed for jobs in advanced manufacturing, IT, across all sectors from healthcare to financial services.

We're moving into healthcare jobs and retail. And we're also moving out into other states. There's a tremendous interest among governors in this because they look at their labor markets, they know they're broken. They're trying to figure out how to enable companies to get the workers they need so that they can grow and how to enable people to feel that they're part of the digital economy, and, at the same time, drive educators toward training the right things. Skillful is basically a systems integrator with an ambition to do that based on a skills-based labor market.

**Tim O'Reilly:** Companies need to make a commitment to training people, rather than just saying, "Well I can't find them." If you think about lifelong education, it's going to happen in the workforce. And I think we need to start thinking more about education as a benefit. Each successive wave of automation in the past has led to taking people out of the workforce and putting them into education.

First, we took small children out of the fields and factories and smokestacks and chimneys and sent them to school. And then we took high-school-age kids out of the fields and sent them to school. And then we took our returning GIs and sent them to school, too. Now we need to basically say, "We're going to hire you and we're going to send you to school when you're on the job. We're going to train you." Why would an employer would say, "I just can't find anybody"? Go make them.

**Zoë Baird:** Tim, I think that employers are very interested in training their workforce. We need to think about skills. We need to get to a modular disaggregated network environment where people can pick up skills in one sector and demonstrate in another that the skills they have are valuable to fill those jobs

**Tim O'Reilly:** Yes, we need to get away from the credential and just go, "OK, can you do this thing. How do you prove that you can do it? And how do we bring you along so that you can do it?"

**Michael Chui:** Let's come back to another topic that we touched on briefly, which is about, what are the rewards of working? What are the rewards of being in in the workforce? Tim, can you talk a little bit about your views on returns to capital versus labor.

**Tim O'Reilly:** I've recently been thinking about the fact that our financial statements are designed so that we basically show people as a cost and the return to capital as the goal of the system, the bottom line. It's the residual, what's left over. And it belongs to the owners of capital.

There's a wonderful book which I just discovered because I used a line in my own book, I said, "One day we will look back on the divine right of capital, the same way that we now look back on the divine right of kings," and somebody read that and said, "Have you read Marjorie Kelly's book *The Divine Right of Capital?*" That is a fantastic book written in 2001 about financial statements.

What if our financial statement showed the return to labor and here's the return to capital. They could show both as outputs of the business, as opposed to one is an input and a cost to be minimized. It makes you think about how differently we would organize the economy. And I started thinking, there are examples of this hiding in plain sight.

For example, Walmart and Costco, or Columbia Sportswear and REI. What do they do similarly, what do they do differently? REI is fascinating; it's a co-op, and they outperform their public market competitors in any real market—better same-store sales, better sales growth. But they also pay their people more and they give the bulk of their profits back to their customers in the form of a rebate.

They're not very profitable, but they don't have to because they're a co-op. Here's capitalism, but it's hiding in plain sight. That's similar to what Marjorie Kelly describes where the returns are not just to capital, the returns are clearly to customers and to employees. And it works. I feel like there's probably a lot more of those that we just don't notice because we're so enmeshed in the system as it works today without realizing that it could be different.

**Michael Chui:** Zoë, you are in the privileged position of being able to connect with leaders in both the policy-maker and the business side in civil society. What are you hearing regarding incomes and concrete actions that can be taken there?

**Zoë Baird:** One of the things I'm hearing is very disturbing, which is a remarkably rapid movement by both Democratic and Republican policy makers, to regulate automation and AI technology companies generally. I think that is, in part, a reaction to this question of, "Where's the wealth going?" but perhaps even more a maturity of the industry.

Pretty much every major industry has gone through a period of innovation, then it becomes an established business, then there's a period of monopoly, and then there's a period of regulation. You can look at the railroads or every form of early communications, and this pattern fits.

The question is whether it is possible to enter a period of regulation that doesn't inhibit innovation, growth, and competition. You see it, obviously, with the EU, which is way ahead of the US. To my

mind, addressing this felt public need for the opportunity to participate in the economic benefits of the digital economy is going to be the linchpin to if this is done right. Because the movement toward people feeling disenfranchised is rapid and it's not playing out well.

I've been very concerned, for example, about how to address the question of recruitment of children into terrorism over the Internet or sex trafficking over the Internet. Those are very discrete problems. But these economic issues are not discrete problems; they could comprehensively affect the trajectory of our businesses. And most of these businesses today that have been so successful are based in the US, but that isn't a given. So, I think there is an enormous potential repercussion of all of this.

**Michael Chui:** Several big Chinese ones, too. What are the actions that people can take, whether they're a business leader, someone engaging with their legislator or policy maker, or an individual worker? What sorts of things should people think about when they think about when it comes to the future of work?

**Tim O'Reilly:** The first thing I think about is that we must believe it can be different. I'm hung up on this idea about the divine right of kings. There was a time when a set of people decided that they didn't buy that anymore. And when we won the American Revolution and the British resigned, George III thought that George Washington would be crowned king in America and was utterly astonished that he went back to his farm.

We basically had a new idea about how to do things. And I think we have this incredible moment, where people are, as Zoë said, disaffected. There is going to be a revolution. One morning over breakfast, Andy McAfee said "All this stuff about the robots taking over? The people will rise up long before the robots do."

If we don't take this moment to rethink our economy in our society in a profound way, we're going to be in for a century of revolution and strife. We're already dealing with climate change and potentially facing the collapse of modern civilization unless we do things radically differently. And I think we should stop making little tweaks around the edges and assume that everything is OK.

We should think far more boldly about what we do in the age of immense, technical change, which could produce incredible wealth for all of society and yet has somehow been designed to only produce wealth for a much smaller group of people. And it's designed that way. And the first thing we must do is to believe that we could design it better.

**Michael Chui:** Zoë, what are things that people can do?

**Zoë Baird:** I completely agree with Tim. People should look at the tools and technology that they have created and figure out how they can be deployed to enable people to participate in the labor market differently. For example, 98 percent of people who sell goods on eBay are multinationals. Whereas, only 3 percent of small and medium-sized businesses sell globally.

**Michael Chui:** And you don't mean large multinationals when you say that.

**Zoë Baird:** No. They're small and medium-sized businesses. They sell their products all over the world and they're exported over eBay. I could give you many other examples of how what each and every one of you is doing could be deployed as a way for people to learn in a modular way, to find out what skills they have, to see what the jobs look like.

For example, people don't see themselves in advanced-manufacturing jobs because their uncle or their brother isn't working in that industry. But if their Facebook friends show them what advanced-manufacturing jobs looked like and that people like them were doing those jobs, then they could see themselves. But I urge you to think about your business assets because that's where we'll get the capital to continue and sustain and grow these activities. There's a tremendous amount people can do if they simply ask themselves the question, "How can I be a disruptor in a way that is going to work to advantage many people?"

**Tim O'Reilly:** It's so important to dissociate work from jobs. Because if you find work that needs doing, it will turn into jobs. When I started my business, it wasn't a job; there was work that needs doing. We're technical-writing consultants. When we didn't have a job, there was still work, so we did the work and then we started selling the books on the side. And it turned out to be a way better job than the one that we were getting from other people.

We focused on how there's something that needs doing here. There's no good documentation. And we started producing it and people beat a path to our door. You look around and there's so much work.

**Michael Chui:** I'd like to open it up to audience questions. Please, identify yourself briefly and then I'd love to hear your question.

**Jason Ma:** What one or two pieces of advice would you share with the G20 governments, prime ministers, or presidents on this topic?

**Tim O'Reilly:** I would say the first thing, again, would be focus on real problems. Think about how do you make life better for people? How do you solve problems for people? Technology, business, the economy: this is all about solving real problems for your people.

**Zoë Baird:** My answer to that question has been that countries should create national digital-economy strategies. I don't think we're in a place in this country where we'll do it, so I'm working with governors all over the country so the governor will create a digital-economy strategy.

That means looking at your businesses and understanding where business growth can come from that can employ lots of people and can employ people who don't have four-year college diplomas and higher degrees. Those jobs are there and the businesses won't grow if we don't expand the labor market for them. I would have a strategy for businesses growth. I'd have a strategy for labor-market training. We won't have a national strategy here so I'm looking to the private sector for the varied tools and technologies that we're using for the higher end of the market to apply to the 70 percent. If we do that, I think we'll find much more innovation that will affect the whole market. Surprisingly, the jobs at the upper end are more static than the jobs in the middle. If you really want innovation around how to drive the labor market through tools and

data, that innovation's going to come in the middle. And that's where our businesses need to grow. That's where the bulk of the jobs are and will be. And that's true globally.

**Tim O'Reilly:** On that digital transformation by government, one of the things that's always been true of new technology is government is often the customer that kick-starts a huge, new industry. Government could become a customer for digital transformation, as well as funder of innovation.

**Zoë Baird:** Right, that's very true. And that's part of what we are working on. That's part of our integration—having the government spend its dollars wisely to drive the creation and sharing of data and the training.

**Tim O'Reilly:** How do we instrument government programs so that they can become more intelligent so they can work better? We could reinvent government so that it works as well as the best tech applications. That's this wonderful way to do a digital transformation of the largest customer in the country. That would be an enormous opportunity.

**Michael Chui:** And there are a couple exhibits in the book that show investments by governments and private sector in training have been declining in a multiyear level across the G20.

**Caroline Fairchild:** Hi. Caroline Fairchild with LinkedIn. In the face of rising automation, how probable is the idea of universal basic income?

**Tim O'Reilly:** I think we should be testing it not universally but in a targeted way, such as A/B tests of what happens when you do it. I think we should see government experimenting. Let's try it in some area and see what happens. But I also think that there are other ways to do the equivalent and that they may be more useful. I mentioned earlier this idea of education as an intervention, where you not only take people out of the workforce, you give them new skills.

Would we be better off giving everybody an education benefit of a different kind, where we pay you to learn new skills, as opposed to just giving you money? Now again, I think there's something wonderful about the idea of just giving people money. But we have hundreds of years of experience that shows that making sure that people get education is effective. Let's experiment with that. Let's just do lots of experiments.

But the main thing is to get more money into people's hands, however we do it, as opposed to letting all this capital sit idle on the sidelines while people are effectively—basically we've got this atherosclerotic circulatory system in our economy where there's just not enough money getting to ordinary people who can spend it on whatever they want. Throw it out of an airplane, do with it UBI, do it with targeted benefits. Whichever way you choose to do it, get more money into people's hands.

**Michael Chui:** For reasons that are unclear, economists prefer helicopters. Zoë, any thoughts?

**Zoë Baird:** I think people want to feel engaged, they want to feel they contribute, they want to grow in their earning potential. And I'm not a fan of that proposal.

**Eric Dunn:** Hi. My name is Eric Dunn. Question for both of you is: Do you have concrete examples of large employers who use technology to augment the capacities of their employees and realize their full potential?

**Tim O'Reilly:** That's the central lesson of technology: augment people; you will be more successful. I talk a lot about Uber and Lyft: we have a lot more people delivering driving services than we ever had in the taxi industry because we have this cognitive augmentation in the app that tells people there's a passenger three blocks over, and not only that, the app will teach you how to get them to their destination wherever it is. That's a cognitive augmentation with a smartphone app and a dispatch system that so far has put, many more people at work.

Amazon put 45,000 robots into their warehouses, and now employs 341,000 people, about 50 percent more than versus the year before. They didn't say, "We're just going to make more money doing the same thing more cheaply." They said, "We're going to augment our warehouse workers so they can get more products out faster. We now do same-day delivery in many locations of more and more products." And I go, "Bang, you put people to work."

So how would we do that in healthcare, for example? How would we do that in education? Give our teachers superpowers through digital education so they could do more. Or the Apple Store. Everybody else was taking salespeople out of the stores; Apple put lots more people in. Gave them super powers with their smartphone apps. Got rid of the cash registers, and all of a sudden become the most productive retail stores in the world. So, there are lots of examples when you look around.

**Zoë Baird:** In addition to Skillful, which is working on the ground and trying to change the labor markets, we also have something going at Markle called the Rework America Taskforce. And some of the people in this room have been involved with that. And one of the things we're interested in is how we can use artificial intelligence. What we're working on now is using AI to make jobs safer, such as in construction or how to use AI to make a whole range of healthcare services safer. And I think there's just tremendous potential for people to have a lived experience of working alongside technology or having AI enhance their work if we can get people into the digital-economy labor market.

Another example that I find very appealing, because I spend a lot of time in other countries, is Google Translate. The notion that I could have wireless earphones that are going to tell me what someone's just said, in a language I can understand, is a tremendous enabler. I think there are a lot of opportunities for people to experience AI and automation as additive, if we can get them engaged in this part of the labor market.

**Michael Chui:** And I know we can talk for the rest of the evening with these terrifically thoughtful colleagues, but I love ending this section on a note of optimism. Thank you very much. □

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