TECHONOMYNYC

Tech in an Age of Insecurity

Speakers:

Rodney Brooks, Chairman and CTO, Rethink Robotics

Fred Krupp, President, Environmental Defense Fund

Gillian Tett, U.S. Managing Editor, The Financial Times

Moderator:

David Kirkpatrick, Chief Techonomist, Techonomy

(Transcription by [RA Fisher Ink](#))

David Kirkpatrick: Let's bring the next panel right up here. Okay, so here we have Gillian Tett, who's the U.S. North America editor of the FT, and probably one of the smartest people I know, and has a very interesting breadth of understanding and perspective on a lot of things that we just discussed with Fred. We have another Fred, Fred Krupp of the Environmental Defense Fund, who's somebody I wrote about first 25 years ago or some ungodly thing like that. He's been doing this great work on the environment all that time and has a very interesting perspective on technology as a tool in this climate change and environmental crisis that we confront. That's one of the reasons I wanted to have him here. And then, our designated technologist Rodney Brooks. I think you said last night at the dinner that you've been doing AI for 45 years. Is that really possible?

Rodney Brooks: Yes.

Kirkpatrick: Okay. That's a long time. He invented the Roomba with I-Robot, the vacuum cleaner. He now has Baxter, the computer that works on assembly lines as a robot. I think he can talk very knowledgeably about what's actually possible in technology right now. I don't know, maybe I'll start with you, Rodney. Were you here for Fred's—?

Brooks: Yes.

Kirkpatrick: Do you share his optimism?

Brooks: I'm optimistic in general but I think we're not going to have enough people to fill the jobs that will be needed.

Kirkpatrick: Interesting. Why?

Brooks: Because of the demographic inversion. Because there are going to be so many older people, less working age people. In Japan, the ratio is going from nine to one working age to elderly, to two to one. Fred mentioned nurses, but I don't think there's going to be enough people to provide support for the elderly. Baby boomers are about to start retiring. We're going

to want to stay in our homes, we're going to want to maintain independence and dignity and we're just not going to have enough helpers as we get older.

Kirkpatrick: There are a surprising number of technologists, including Fred's partner, Albert Wenger, who say that they're worried that because technology is going to create so much economic growth, they're worried about the jobs that will be available and unfilled. You don't agree with that, am I right?

Gillian Tett: No. I mean, what I find fascinating about Japan, speaking as someone who's spent years of my life in Japan—I was actually there just last weekend. The Financial Times these days is actually owned by a Japanese company. A few years ago, I had a panel a bit like this, with Paul Volker from the Fed. We were talking about why the Japanese economy has so massively underperformed in recent years in terms of growth. Paul made the point that if you look at Japan in terms of GDP per capita, not overall, actually growth has been fine, because the economy has been flat, or shrinking, because of demographics. He posed the question, which is very relevant to today, which is: Could we think of any examples in history of an economy whose population had shrunk but had continued to grow? The only one anyone could think of apparently was post-famine Ireland. It was a very interesting question, because traditionally, demographics and growth have been intricately entwined.

Now, what is fascinating today is that we may actually be at a breakpoint for the first time in history, because the power of robotics and digitization means that potentially economies can grow and become more productive, without necessarily needing to have lots more workers. In Japan last weekend, the great discussion right now is that they're running out of workers to do many ordinary jobs but Japan is embracing robotics with an enthusiasm that is unimaginable in America. In Japan, no one is saying, "Are robots going to take our jobs? Help! Let's all run for the exits. Let's all vote in Donald Trump." In Japan, they're saying, "Great! Thank God robots are there. We may actually get out of the demographic problem as a result." That may be specific to Japan, but the other thought I'd leave you with is that right now the demographic pyramid in China is actually much, much, much worse than Japan.

Kirkpatrick: So that would mean that China will probably lead the world in robotics and automation?

Tett: You don't see that today. But, in 10 to 20 years, because of the one-child policy, the demographics in China are beyond terrible. They're much worse than anything seen in Japan. China has an enormous problem coming down the tracks, because of this incredibly unbalanced demographic pattern right now. Maybe we need to change the conversation about robotics beyond the current one, which is very Western-centric and very European-centric too.

Kirkpatrick: But, what do you think is going to happen in the UK, the US, Western Europe? The demographics aren't so great in Western Europe either but here they are. Do you worry about the jobs issue? Do you disagree with Rodney when it comes to the United States?

Tett: No. I worry enormously in the short to medium term, because the reality is that you're going to see a lot of jobs disappearing, you are going to see massive skill mismatch. I think that Fred's optimism in the previous panel was fabulous, I also think the comments challenging him were fabulous, too. If you're sitting here in New York right now, having nice granola breakfast on a sunny day, yes the world looks great. Believe me, I've spent quite a lot of time out in the heartlands recently and the world does not look great there at all because actually people are not jumping on board the tech train.

Kirkpatrick: Just to keep on you for one more second. What Michelle over there pointed out about Zuckerberg is interesting. How do you explain his national tour? Is it to achieve what you just said? I mean, you must applaud it given what you've just said.

Tett: No. The last book I wrote was called "The Silo Effect" about the danger of people getting trapped into tunnel vision and tribalism. I was inspired to write it because I saw what had happened to the finance industry before and after the financial crisis. The finance industry was not only very fragmented inside companies, which meant that people were doing dumb things. They were trapped in a social and mental bubble, which meant that they lost sight of common sense. They couldn't see how the rest of the world saw them and they couldn't see things in perspective.

What has struck me for the last two years is that Silicon Valley today is potentially in exactly the same place that Wall Street was in in early 2007. They think they are masters of the universe. They think they're in charge of technology that's going to save the world. By the way, financiers in early 2007 said exactly the same thing. I'm trained as an anthropologist and if you look at the rhetoric and the framing of the conversation in Silicon Valley today, it is terrifyingly similar to Wall Street back in 2006 and 2007. You've got well-paid people cut off from everyone else and, frankly, working so hard that they are trapped into tunnel vision and thinking. The one thing that gives me hope is that people like Mark Zuckerberg are actually aware of the problem on some level. They are trying to get out and engage with it on some level. The question though is, "Will that be too little, too late, before there's a massive backlash against tech?" The very last thing to leave you with is Edelman, the public relations firm, does a fascinating survey every year of what people trust in. Before the financial crisis, trust in finance was sky-high. It's since collapsed. In the last 10 to 15 years, the only sector where trust has not perhaps yet collapsed is tech.

Kirkpatrick: Well, for what it's worth, I agree. There's a rolling crisis of confidence in tech that they don't yet realize. Rodney is a Massachusets-based leader of the tech industry. Do you agree with that? Fred, we'll get to you in a minute.

Brooks: Oh, I completely agree with just about everything Gillian said and I think there is an amazing bubble in Silicon Valley right now. Flying cars, Sebastian Thrun with his stupid, stupid company—supposedly flying cars.

Kirkpatrick: Oh, you mean Elon Musk?

Brooks: No.

Kirkpatrick: They're both stupid? Okay.

Brooks: No, flying cars, I'm talking about.

Kirkpatrick: Oh, right. I'm sorry, I got that wrong. But, Elon Musk said at TED that we'll have self-driving cars in two years. You had some choice words for that one also on the phone.

Brooks: I tell every Uber driver, "Your job is safe. We're not going to have self-driving cars mixing with ordinary cars on the roads anytime soon." We've been trying to put self-driving trains out for 45 years, we haven't been able to do that. There is going to be a partitioning of different geographic pieces of our cities to self-driving and non-self-driving, but they're not going to mix for a long time. Pedestrians and self-driving cars are not going to mix. People are just out to lunch about that in Silicon Valley.

Kirkpatrick: I love strong opinions. It really does help, doesn't it? Fred, one thing that has barely come up yet, even though we've been talking big picture, is the climate change crisis, which is one of your obsessions, although you have wide-ranging awareness also. Anything you want to say about what you've heard so far from Fred, or your co-panelists here, or how you look at the role of technology as a tool to address the kind of context we're in right now?

Fred Krupp: I think technology has tremendous power to scale and give us the size of the changes we have to achieve urgently. I do first want to agree with what Gillian said, that we cannot afford to be over-exuberant about the possibilities of technology. A problem like climate change and all pollution problems in fact, just about any conservation or environmental problem I can think of is based on externalities. Unless you have governments playing a role, tech-schmeck, it won't make a difference.

Tech can play a huge role, but we cannot afford to ignore the fact that in this country, for the first time in any civilized country in the history of the western hemisphere or western civilization at least, the backward strides on environment issues are absolutely unmatched and very grave threats. Just to spend a second on that, the president has moderated his position on China as a currency manipulator, on his position on NATO and I could go on and name half a dozen as any of you could. But on the environment, it's like a death march off a cliff. I'm not known for extreme rhetoric but he's appointed this fellow Scott Pruitt to run the EPA. Scott Pruitt was last seen heading over to the White House to argue that the United States should get out of the Paris Agreement. That's the head of our EPA. He's trying to repeal rules on mercury, sulfur dioxide. It's a really, really serious situation.

Having said that, I do believe that technology can fill a gap for a while and ultimately when we have a more rational government, can turbo-charge progress. The cost of monitoring what used to be invisible, pollution, is going way down. The availability of big data and to analyze data, is going way up. We've had Google cars. They're street cars looking for methane leaks all over this country. We have maps up on the website. This is making these expenditure of billions of

dollars in pipe replacements targeted to the pipes that are leaking, instead of just not targeted and wholesale doing this city or that city.

Kirkpatrick: So it's being applied in pipe replacement now, that knowledge?

Krupp: Yes, it's being applied on the other side of the Hudson River by PSC&G and elsewhere several other places in the country. It needs to be applied more. We've flown over 11,000 wells, that's 1% of the oil wells in this country, either with drones or with airplanes and we've figured out where oil and gas wells are leaking methane, a very potent greenhouse gas, 80 times more potent than carbon dioxide in the first 20 years of its release. This has given us the knowledge with infrared cameras, again to see what was invisible, not it's visible. It allows us to target and it allows companies who want to and governments to force companies that don't want to, to target the places that are actually leaking with a scalpel instead of a sledgehammer. It minimizes the cost of fixing these problems.

Kirkpatrick: Just one last question. Are you agreeing with me as opposed to Fred, that the governments inattention—maybe if we throw science as well as tech into it at a macro scale and I don't mean only the Trump administration—is problematic for the society we're going into? I'm going to get to you on this, Rodney, since you're nodding. Is there a crisis of understanding? Trump is kind of an outlier crisis in himself, but to me the government's ignorance about technological progress and its role in the economy and the role of science in changing the way that everything happens in our economy, is potentially very problematic. In reality, it's already problematic. Is that what you're saying, do you agree with that?

Krupp: It is. I think the folks running several of our federal agencies now have a 1950's mentality, in that the only way to jumpstart business is to get rid of environmental safeguards. I've spent my career, as you know David, arguing for regulatory reforms. Simpler ways of the government being involved, performance measures, incentive measures, market measures. When this administration talks about regulatory reform, it's not talking about that. It's talking about no protections and literally rolling back a whole series of safeguards. It's a major backwards step.

In the face of that, we can keep going and develop ways to look at the Earth from space, satellites. Measure air pollution, we're measuring air pollution in Oakland at a precision level we've never seen before. Every 50 feet, we've had cars drive over each spot 50 times. 3 million pieces of data have been collected. We've mapped Oakland's air pollution and how it affects low-income and poor people living in West Oakland to a resolution never done in any city before. The tools are there waiting for governments at the state and local level. There still are governments to apply this knowledge to surgically and less-expensively fix problems.

Kirkpatrick: Rodney, government.

Brooks: I think the previous Fred has the view from a venture capitalist, which has to be a business model. Gillian, I think the same is true in Silicon Valley. But, there are existential

problems for us as mankind, where that VC-backed business model doesn't exist. My own bugbear is plastics in the ocean. There is no VC way to turn that into a business, unless governments or something of that size gets involved. It's a global problem, it's not an individual country problem, which makes it much more complicated. I think tech has a role to play in cleanup, but there's no business model for it.

Tett: I was going to say, I just wrote a column about this in relation to health, which is a rather different issue. One of the great challenges of our 21st century world is that most of the big challenges we face are cross-border in nature. Yet, our institutions are primarily national and we pay remarkably little attention to what cross-border institutions that do exist. How many people in the room actually know that WHO is about to elect it's next head? One. Okay. Or else you're all asleep.

How many of you can name the three candidates? Yes, think about it. There's just been an outbreak of Ebola a few days ago, in Africa. What the WHO does or does not do, in the next five years is going to be crucial. Yet, most people don't even know there's an election for the next head. You extrapolate that onto environmental issues, you extrapolate that onto financial markets, you can extrapolate that onto almost any big global challenge for today, including the internet, by the way. How many people know about the cross-border agency that actually is supposed to monitor the internet? I mean, you guys might, because it's a biased audience. Anyway.

Kirkpatrick: Which agency is that? ICANN?

Tett: ICANN, not monitor, but is there anybody that's trying to look at the internet and tech development in a global context effectively?

Kirkpatrick: No! There's not, right? That entity does not exist. It should exist, is what you're saying.

Tett: Well, that should be your cause célèbre.

Kirkpatrick: Well, it has been one of my cause célèbres, as a matter of fact. What do you think, how could we get there, Gillian? That requires, for one thing, a willingness on the part of our own government to participate in global regulatory mechanisms of any sort, which is the opposite of the direction we're moving, first of all.

Tett: Well, let's get real. The last time the world created meaningful cross border organizations was after World War II, when they set up the Bretton Woods institution. Before that, they created the United Nations response to disaster, war, devastation. Let's hope it doesn't require that again.

Kirkpatrick: You mean, a crisis of that gravity?

Tett: Well, it'd be nice to think that's not the case. But there's a bigger question here which is that in theory technology could give us the most amazing opportunity to empower citizens and remake politics.

Kirkpatrick: It does.

Tett: Potentially. But let's get real here. The number of times I've gone to Universities and I'm about to do a commencement speech on Saturday and I say to people, "Are you guys political?" They all go, "Yes, we tweet." If they're really political, they might go to a demonstration. I say, "Yes, are you actually voting?" In the UK, kids and students did not vote, which is one reason why we had Brexit. "Are you actively engaged in trying to find some way to participate meaningfully in the political process or give public service?" Yes, some kids are. Yes, one of the things that has occurred as a result of the Trump presidency is a greater sense of activation amongst kids. Finding ways to use technology meaningfully to try and have political conversations and try and get kids activated, that's a question which I think is very unanswered in terms of its actual impact.

Kirkpatrick: Just to go back to Zuckerberg again, for a minute, which is one of my pet issues— talk about cause célèbre. His letter in February talked about that exact thing. He's actually saying that he thinks Facebook could be the entity to create what you just said you wanted. Do you buy that?

Tett: Okay. Well, my first thought about the letter from Zuckerberg, anything which is 6,000 words long needs a decent editor.

[LAUGHTER]

Tett: There's a reason why newspapers have editors. There's a reason why citizen journalism can become unwieldy and undisciplined. That's point one. Point two is and I'll try and keep this as brief as possible.

Kirkpatrick: He has half the former government in his employ, by the way, so he shouldn't be considered just a citizen, but go ahead.

Tett: Facebook know they have a big problem, partly because they are in a silo bubble like Wall Street in 2006. Also because technology is changing the way that we operate in our political economy in really fundamental ways. I call this the FUCU problem. I devised this framework after the Trump vote. It captures the way that voters think right now. Not just because FUCU shows anger, but because "F" stands for fragmentation. Cybertribalism is one of the biggest problems that we have today. The fact that the technology that we think, that we have an illusion, that is going to connect us, actually fragments us and we don't notice because we think it connects us. So, "F" is fragmentation. "U" is unbowed, untrusting. Basically, trust has moved from being on a vertical axis to a horizontal axis. We used to trust authority figures and institutions, today we only trust our Facebook friends.

There's a lot of data I can give you to show how that's shifting. If you don't believe me, just think about what happens if you go to a restaurant. You don't get Zagat's anymore, you go online and you check your peer group for what they think. It's empowering and good but if you combine that with fragmentation, it means that different tribes are increasingly only talking to their own tribes, getting information from their own tribes, only trusting their own tribes online and guess what? You end up with, dare I say it, alternative facts and alternative media. The "C" is customization. We've moved into a world where everyone thinks they've got a God-given right to customize every single thing around in their lives.

Again, that feels empowering until you transpose it onto politics and the "F" and the "U" and you end up in a world where everyone thinks they can do "pick-and-mix" politics and just pick particular issues like, nationalism, or anything else. You can't have the meaningful conversation in this framework. You add that together and you have a recipe for cyber flash mobs, for sudden outbursts of political heat, for very little meaningful action of the sort that Fred is trying to get with his Environmental Defense Fund, and profound instability and uncertainty and unpredictability.

Kirkpatrick: That's what the last "U" is?

Tett: Yes. I think that sums up what's happened in the last year when you look beyond the Trumpian result. Tech can be a force for good. Right now, it's as much as anything, a force for bad in politics.

Kirkpatrick: I think that's overstating it, but I think there's truth in everything you said. It's still a very positive force for connectivity at the same time, I think.

Tett: If people engage their brains alongside their thumbs.

Kirkpatrick: Okay. Either of you want to respond to any of that? I think we should hear from the audience too.

Tett: I'm sorry, I'll shut up.

Kirkpatrick: I love it, I think it's all good.

Krupp: I think the responsibility of groups like mine, Planned Parenthood, any of the advocacy groups, is to figure out how to harness tech effectively, to create sustained activism and voting. We can't just decry citizens for their lack of citizenship. Now there is a huge yearning of people to engage, as Gillian pointed out, up to us—people that run multi-million dollar national-global groups—to give them meaningful outlets for sustained activity.

Kirkpatrick: Were you thinking more about that? Because honestly, no offense and I love EDF, but you've always been very corporately oriented in terms of your membership strategy, one might say. You have members, but I don't think of EDF as an army of people, no offense. Is that something you would like to become?

Krupp: Yes. We're known for being policy wonks, there's no question about it. We have been investing in an army of people for a while now and we now have 3 million members, 1 million of them are part of a very powerful network of mothers called the Mom's Clean Air Force, run by Dominique Browning. It's a fabulous network of mothers who blog about these issues and produce people for meetings with senators and congressman, activate people to vote. That's a million members strong. We have Defend Our Future of young folks, who stand to lose the most from climate change, activated. We are definitely going in this direction. We just won, as an example of this, the first vote that the Trump administration has lost on any issue, in either the House or the Senate. Last week, by a vote of 51 to 49, the Senate decided to preserve the rule on oil and gas pollution.

Kirkpatrick: Methane.

Krupp: Methane going into the air. That was evidence of hundreds of thousands of people making phone calls, visiting Senators, to get that done.

Kirkpatrick: That's wonderful. Just also, I bet they use Facebook as the primary tool to keep those groups together, just for what it's worth. These systems have a very multi-faceted impact, is all I'm saying. I think you could see so many negatives, but you can still see tons of positives and it's a very complex thing to know, therefore, what to do about the disproportionate weight of these systems. That's all I'm saying.

Tett: I'll just say that Facebook are keenly aware of the issue of fragmentation and they're even hiring an few anthropologists, hooray, to try and think about it. The issue is that they recognize that they need to find ways of bolstering community. Every time you try and create a community online and you also start to exclude people as well and you risk creating more fragmentation.

Kirkpatrick: Okay, who wants to comment or question? Somebody new.

Kafinas: Hi, how are you doing? Dimitri Kafinas. I actually agree very much with what Gillian had to say. I think though, it isn't just of course the silo-ing, which is a big part of the problem in social media. I think also the way in which the algorithms drive the content and the way in which the content has to compete with—I mean, a cat video will have to compete with a piece of journalism. I think a major question for me and this is a question for you specifically Gillian, since you work in news. The Financial Times does have a strong subscription model that they incorporate.

Tett: Which I hope you're part of. If not, speak to me afterwards.

Kafinas: I am. What is the future of news in the context of the fact that so much of the content is being driven and intermediated through these platforms and so many of the content creators have been losing control of the distribution. What is the future? How do we get to good-quality content?

Kirkpatrick: We have a session on that later today, but I want to hear—

Tett: I'd say, look for the session on that later in the day. That's called narrative suspense.

Kirkpatrick: Once a day is all we're going to get her.

Tett: Two or three quick points. One is, I happen to believe that although there is a huge amount of content out there which is essentially free, there is still demand and thirst for credible information, for information that's put into context. I say the several C's: credible, context and connected, in the sense of being joined up. People want to know how to interpret, how to frame, how to understand and how to trust information. For that reason, I think credible groups like *The FT*, like *The Wall Street Journal*, *The New York Times*, I think they will very much continue to have a franchise. That's our franchise. Ironically, as the rest of the media gets more siloized and fragmented and customized, the actual premium for providing connected, joined-up, silo-busting news I think is still there.

We happen at the FT to be in the fortunate position of having had Bloomberg train an entire generation of consumers to expect to pay for financial news. That's different from something like *The Guardian* or *The Mail*, or other platforms, where essentially consumers have been trained to assume that information will be free. We start with that advantage and we also think we have a premium product, which has cache and people will pay for. The crucial thing to know right now is that five, six, seven years ago, the vast majority of our revenue came from advertising. Today, the vast majority of our revenue come from subscription.

Kirkpatrick: By the way, I think the FT is the single best newspaper for perspective. It's not so focused on breaking news, partly because it doesn't even get the last end of the day.

Tett: We've had a series of scoops! We got the first interview with Donald Trump!

Kirkpatrick: Okay, you could get scoops, but the thing that is so great about your paper, is the perspective with a slight British twist. It's the only paper that I have in my bag over there right now and it's a physical paper. Next comment or question.

Brandfon: Bruce Brandfon, Planet Forward. Just picking up on what Gillian was saying and the gentleman who just commented. Fragmentation and untrustworthiness, there was a time when the media controlled the distribution. Now the distribution is controlled by the audience and God help us. They find the information that they deserve and want. How do we shift that? I think there's a trend now with all the fake news and the consequence of fake news and Mark Zuckerberg's mea culpa, if you want to call it that. Is the pendulum going to swing back to a time when there are trustworthy sources of information that reach massive numbers of people? The Financial Times is a brilliant product, brilliant platform, but it has a limited scale. What about competing with the 2 billion—

Kirkpatrick: It's very expensive, The Financial Times, just for the record.

Tett: I'm afraid it is, yes. But hey, it's less than a coffee a day. Do you think going to Starbucks is very—

Kirkpatrick: It's worth it, but it's not something that everybody is going to pay for.

Brooks: But it's not 2 billion users of Facebook.

Tett: I agree. I realize that I've dominated the conversation, do either of the other two want to—

Kirkpatrick: I wondered if you had thoughts on that. Fred probably would.

Krupp: No. I think it's a question for you. Rodney may have. Do you?

Tett: I love wriggling out of talks about the media by the way. I'm happy to talk about it.

Brooks: The conversation has gone in a direction where I don't feel as qualified as these people.

Kirkpatrick: We have other kinds of questions, I hope. Who has another kind of question? Okay, back there. Please get the mike. Okay, it's coming to you.

Bromberg: Gray Bromberg. I'm curious, so much of the focus has been on technology, but a lot of the failure that we're experiencing is failure of elections, in general. There's a great book that came out about a year and a half ago, called *Against Elections* by a Belgian writer named David Van Rybrook. His perspective is that we have essentially the tyranny of elections that's created a fatigue among the electoral class, basically among voters. Party participation is at an all-time low. Voting is at an all-time low and this is a global phenomenon. Part of the issue may be that electoral democracies themselves are not creating participation capabilities. I'm curious and this does connect, I think, to an AI perspective, as well as to a news perspective, as well as to a technology perspective. What's the panel's view on how we can induce participative characteristics, as opposed to political—Gillian, when you said, "These kids have got to get off their phones and start focusing on politics," but the political capability is busted, because they're expecting that elections are going to deliver change, they may be sadly mistaken. Maybe we have to think about it a different way, approach it from the perspective of, "What capabilities of participation can we engender?"

Kirkpatrick: We can consider these comments as well as questions, unless somebody has an urgent response.

Tett: Can I say one thing quickly on that?

Kirkpatrick: Yes.

Tett: I spoke to the Chinese government a couple of years ago in Davos and we were arguing about democracy. They turned around and said to me, "Oh, well we don't. You have democracy in the west, we have Twitter." Or, the equivalent of Twitter. What they meant by that, is that the Chinese government very much sees its role as using social media as a weathervane to test the public views—

Kirkpatrick: They really do.

Tett: —and the boundaries of political and public acceptability.

Kirkpatrick: I didn't know they said that.

Tett: This was off the record, by the way.

Kirkpatrick: That's been one of my theories for a long time, that China was in some ways the most democratic country in the world. Their surveillance of social media is so thorough, they know exactly what their people think.

Tett: You are very prescient. They literally view their role as staying one millimeter ahead of where public opinion is and not too far. Now, you can turn that around. There's plenty of reasons to think the Chinese government is not remotely democratic or really cares about the population unless they're going to revolt. But, you can turn it around and say to the American public today, "Okay, so kids say they can't be bothered to vote. They didn't have any problem voting for American Idol. They don't have any problem voting for things they get involved in every day."

Bromberg: In fact, I think you could use bit-ledger technology as part of that very same motion. Bit-ledger technology, I think, is also potentially capable of being involved in a voting context—

Kirkpatrick: That's what Fred said. Were you here when Fred was here?

Bromberg: I was, but he didn't apply it to—

Kirkpatrick: Oh, I think he would've applied it to that. Okay, let's keep moving.

Tett: I would like to ask Fred. How do you think you get kids actively involved in voting for environmental issues and having conversations about the environment that go beyond one tweet or one Facebook post?

Krupp: Well, there is incredible cynicism in the younger generation and alienation from politics and elections and nonparticipation. The way you get them involved is by showing that these campaigns and these elections can make a difference. We are now embarking and many of our peers as well, in training younger people on how to run for office and how to run campaigns. I think as people see that these problems are not hopeless, there is hope through participation, it will inspire more.

Kirkpatrick: Are you encouraged by this upsurge in people wanting to run for office in the United States in the last few months?

Krupp: Very much so. There is this surge of people that want to do something given our current situation. I think part of the responsibility, as I said before, is on us to give them the tools to do it.

Kirkpatrick: Well, good for you. I think that's very cool. All the way back in the back, let's get that hand back there. I'm trying to get people I don't know and haven't heard from. No offense.

Sullivan: Good morning, Tanya Sullivan. Rodney, I have a question for you. You mentioned, obviously, that you've been in AI for 45 years. It's slightly different than where the conversation has been going, but I'm just curious, after having done this for so long, why do you think it's becoming a thing now? Why is AI all of a sudden something everyone's engaging with, whether it's with society, with politics, with government, with personal issues? What is it about AI that's capturing everyone's attention now?

Kirkpatrick: Great question.

Brooks: I think we've had some tremendous successes, deep learning was not expected and it's had tremendous success. It's why we now have usable speech interfaces, to Alexa, to Google Home, etcetera. So, there are real successes there. Then I think the press and pundits, many of whom are physicists, or whatever, make a fundamental error in the understanding of how good AI is. This is the error they make: When we see a person perform at some level, we have an intuitive model of how to generalize what their competence must be. That doesn't apply for most of these AI techniques. If you see a person sitting down, taking photos and writing Chinese characters that describe what's in the photo, you would expect that person to be able to read Chinese for instance, to be able to talk about the weather in Chinese.

The AI systems that label images, for instance, can't read. They don't know weather exists. They don't know people exist. They can label images. Our intuitive model of how to generalize from performance to competence does not apply to these very narrow AI systems and I think therefore people have gotten very afraid of AI systems and robotics in general. They're thinking it's going to have much more capability in the short term than it really will. I reference Roya Mara's dictum, "We tend to overestimate technology in the short-run and underestimate it in the long run." We're overestimating AI in the short run, we're overestimating self-driving cars in the short run. Fifty years from now, it's going to be much more pervasive. We're underestimating it in the long run.

Kirkpatrick: Give us the most surprising thing that you expect will be the case in 50 years that we're not generally expecting.

Brooks: I wish I knew.

I go back to computers. When computers first came out, people were making outrageous predictions about them in the short term. But if we look at Science Fiction from 50 years ago, they had no idea how computers would turn out. They underestimated it at the 50 year range. We cannot make coherent, no one can make any sort of good prediction 50 years out. But it will be intense.

Kirkpatrick: Long term, are you fundamentally optimistic that it'll be really good or do you think that it could be really scary or both?

Brooks: It's going to have unintended consequences, like social media has had unintended consequences of fragmentation. There are going to be all sorts of consequences, which we can't think about. Likewise with self-driving cars, lots of consequences on how that's going to completely transform our cities in the same way that horseless carriages transformed our cities.

Kirkpatrick: Okay, thank you. How about this guy, right here? Get the mike.

Vasilatos: Thank you, Dionisios Vasilatos. I wanted to go back to the comment about tunnel vision and the implications of that to the heartland as an example. My question is very specific, maybe a deterministic question. Do you on the panel see a causation between that tunnel vision and opportunities being left on the table? I guess the assumption is that Silicon Valley and everybody who's participating in tunnel vision is ultimately following where the money is, right? That's how they exploit it with business models and monetize it.

Tett: Briefly, my last book "The Silo Effect" argued very strongly that silos make people blind, both to risks and there's endless examples of that in finance, in every other field you can think of. They also make people blind to opportunity. I tell eight stories in my book and the story I tell to indicate that is Sony and why it missed the iPod. Why Apple did the iPod instead. You can take that story of Sony and the problem of silos and transpose it into numerous different fields and corporate fields. The flipside is that if you learn how to silo-bust, you basically have one of the most powerful secrets to innovate and to steal as much from your rivals.

Kirkpatrick: And, what do you do to silo-bust?

Audience: Give us your secrets.

Tett: [LAUGHS] Well, you can all go out and and buy the book.

[LAUGHTER]

Tett: Thank you whoever did buy the book. How do you silo-bust? I haven't got time to talk about it and it's unfair for the rest of the panelists. Basically, it's about learning to 1) Recognize that you have silos and recognize they're inevitable, 2) Think about them consciously and how to deal with them. Think like an anthropologist. I'm passionately in favor of the principles that anthropology and have been trained in that field. It's just learning to re-think how you look at the world, to recognize your limitations and imagine alternatives. Companies are actually doing it. Most winners are doing it without even recognizing it. Steve Jobs was a silo-buster and that was one key reason why he essentially was so successful.

Kirkpatrick: Is that why you call your company Rethink Robotics, Rodney?

Brooks: Actually, the reason we call it Rethink Robotics is, it started out named Heartland Robotics and it was in support of the heartland of America and the future of its manufacturing. We got pushback and I wish that I had connected the dots. The pushback was and this is our customers in the Midwest, "Why didn't you just come out and call it Bible-belt Robotics?"

[LAUGHTER]

Brooks: We had to come to Boston to find out about the Heartland. The contempt buried just below the surface for these coasters doing something in the heartland was there five years ago, so we had to rename because—

Kirkpatrick: You could've moved to Cincinnati.

Tett: JD Vance in "Hillbilly Elegy" writes very powerfully about the heartlands and about the dislike and distrust of the coastal elites. Actually, to his enormous credit, what he's doing right now is going back to Ohio and trying to take VC and tech back to Ohio. God bless him, I hope it works.

Kirkpatrick: Steve Case is another person doing that.

Brooks: Speaking of bubbles, this is something close to my heart. I think there is an incredible bubble in the middle of the country, not understanding diversity and being scared of diversity. No matter how much we paper over, it's economic. There's a tremendous amount of racism driving a lot of this.

[APPLAUSE]

Kirkpatrick: I was going to say, we have to end, but that's such a grim note to end on.

[LAUGHTER]

Kirkpatrick: One more person. Oh, hey! I know you'll ask a good question.

Benjamin: Last question.

Kirkpatrick: Identify yourself.

Benjamin: It's inspired by Fred's comment about—Rich Benjamin and I'm a writer. It's inspired by Fred's comment about Pruitt. Virtually no one in the Trump administration has expertise in what they're actually running and then Gillian's comment about the news. The question is—and the fact that most of us don't know who's leading WHO, the World Health Organization. The question is why do you think there's this growing distrust of expertise around the world and then how do you square the circle between the fact that the world is becoming so complex we need experts in climate, we need experts in financial issues and regulation and yet people feel

that there's this whole regulatory system and deep state and experts that aren't accountable to democracy? What do we do with that?

Kirkpatrick: Haven't you studied this yourself?

Benjamin: No.

Kirkpatrick: Well, you went to the heartland.

Benjamin: I don't know why you can have a government where people are dismissing expertise and then why you can have a vote like Brexit, where on the one hand people are saying, "There's expertise that isn't accountable to us," without accounting for the fact that you need experts to run the world.

Krupp: Part of it is the cynicism that exists, let's face it, that elected Trump, that causes people not to vote or want to participate. There is good justification for that cynicism. We have in Flint, Michigan thousands of kids being served by water that comes through, intentionally, lead pipes. Around this country, we have millions of people, ten million lead pipes still serving households. The expertise has to shoulder the burden of delivering results. Technology entrepreneurs can deliver incredible results, but I guess the point that was made earlier by all of us is government and public service have a role to play.

You don't get those pipes replaced in Flint or the hundreds of other cities like Flint without individuals in elected office making decisions that are responsive to their constituencies. We have a democracy. I'm not going to trade our system for China's system, or with all due respect, any other system. It's up to us to participate, whether it's running for office or getting involved, to make it work. When we deliver more jobs to the Midwest, clean water to people who've been fed lead-laden water, then people will trust. That's up to all of us.

Kirkpatrick: That's a great way to end. Thank you, Fred. Thank you all three of you. Thank you so much Gillian, Fred, Rodney. Thank you so much.

[APPLAUSE]