

TECHONOMY

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Can the U.S. Stay Competitive? Retaking the High Ground in Applied Technology

Speakers:

John Kao, Institute for Large Scale Innovation
Pradeep K. Khosla, University of California at San Diego
Vish Nandlall, Ericsson

Moderator:

Zachary Karabell, River Twice Research

Kirkpatrick: Could the next panel come up? I want to introduce Zachary Karabell, the moderator, who is a friend and somebody you all should know, if only to read his extraordinarily insightful columns in *The Daily Beast* about markets and the economy, which are consistently the best analyses I read of what's happening. He's written a number of books. He's also an experienced business guy who is running a hedge fund. He is a really multiple-threat thinker. We're really pleased to have him and this great panel to talk about what's happening to our own country.

So go.

Karabell: Thank you, David. Just as an addendum to that, I'm actually shifting what I'm writing this week to Reuters and the Atlantic and starting a column called "The Edgy Optimist" because I thought the market of doom, gloom, and the world going to hell in a hand basket is relatively saturated.

[LAUGHTER]

So if the panel seems unusually or surprisingly male, it is because unfortunately Padmasree Warrior, who is the Chief Technology Officer of Cisco, has fallen ill. She's actually given me a few notes. So at one point, I may pull out my iPhone and channel some of her thoughts. But she sends her regrets and we certainly regret not having her.

That being said, I think we can at least hold down our part of the fort. Clearly, this particular panel: In relation to the theme of Techonomy innovation, its discontents, its problems, and the nature of the United States as an historic 20th century leader—particularly in applied technology and innovation globally—what is the fate of that and the current state of that in the early part of the 21st century?

To my left I have John Kao, who is the CEO for the Center for Large Scale Innovation, which I was remarking before, I mean, it's much better than the Center for Small Bore Innovation. If you are going to think, you might as well think big. John has an unbelievably impressive and amazing resume, including as a producer of film and theater—think *Sex, Lies and Videotape*. We'll talk to you about that tonight late.

And to his left—all of this is simply geographic, none of this is political; I mean, I have no idea, they are all from California, so it may actually be political—is Pradeep Khosla, who is the recently anointed chancellor of the University of California at San Diego. I believe the eighth person to hold that role, having had a long, and I think as all of you know, a very distinguished career at Carnegie Mellon before that.

And to his immediate left is—I want to just make sure I get your last name pronounced correctly Vish, having spent so much time—Vish Nandlall, who is the chief technology officer and the head of, I guess, long-term vision for Ericsson. You have had a long career in various technology and telecommunications roles. And this is the latest and certainly one of the most exciting.

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So the gist of this panel is: Many of us are aware of the precarious—or at least we are told that the state of American innovation, particularly in technology, is precarious. Everything from education ranks and where American students fall in terms of test scores relative to global competitors/peers in things like engineering, mathematics, and other skills that are the necessary or perceived to be the necessary bulwarks for innovation to questionable infrastructure (I was at dinner last night with one English gentleman, one French, both of whom were talking about how lovely the United States was and how much more optimistic it tended to be, but how utterly abysmal the infrastructure in airports were that made you think you were landing somewhere in Nairobi in 1960) to questionable cell phone service. Why can you get better cell phone reception on the Great Wall of China than you can at the Great Wall Chinese Takeout in Midtown Manhattan?

So, I mean, they are all a series of issues that I think we all are acutely aware of as being challenges. And I think one of the points of this panel is to bore more deeply into those challenges and at least from my perspective to question whether those challenges are in fact as challenging as we at least right now perceive them to be.

So with that, I'm going to start with John and ask the ultimate big-picture question, particularly because one of your roles now is bringing together—which I'd like you to talk about—innovation officers or innovation heads of various countries, not just companies.

What do you think about where innovation stands globally right now? And where is the United States within that global panoply, in fact?

Kao: Well, the big news about innovation is, in fact, that it's gone global. You could look at almost three eras of innovation through that lens.

After World War II, the U.S. was really the only game in town, not only innovation-wise, but really competitiveness and economically. It was responsible for just about half of global output. It was unscathed in terms of the physical plant, and it converted the arsenal of democracy into this great economic force that spread consumerism around the globe. We had unscathed universities. Everyone wanted to come to the U.S. for science, for technology, for education. I would wager to say that all of the folks on the panel in one way or another—I know my parents kind of came to the U.S. because they wanted to go to graduate school and live the American dream.

The second wave is perhaps about 20 years ago we started to see countries like Singapore and Finland begin to invest explicitly in innovation capabilities. Finland in '91, after this almost near-death experience of the economy, produced Esko Aho, the prime minister who said, "We're going to compete based on three things: innovation, science, and education." Singapore migrated from being kind of like a hub for supporting multi-nationals in Asia to a country that today has a science, technology, and innovation council run by the prime minister, multi-billion dollar venture funds.

And then the third wave, which is very visible to me as the head of this Institute for Large Scale Innovation, is the fact that there are probably over 50 countries in the world now that have some designated chief innovation officer, national innovation strategy and big funds, big chips being pushed into the middle of the poker game to try to compete.

So this is the context within which we have to look at American competitiveness in terms of the innovation topic. And I think it's useful to try to at least notionally to peg a definition of innovation, of competitiveness, which is that it's about firms being able to compete successfully globally, but also about being able to support rising standard of living, higher wages, and a trained workforce.

So that's maybe both the good news and the bad news of innovation capability here. I mean, certainly you look at America's culture, which is probably, I think, in some respects our only absolute advantage in this world of globalized innovation where forgiveness of failure, tolerance of wild-ass ideas, delight in experimentation, risk taking are woven into the way we do things.

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And this is dramatically less or not true of other countries. Singapore, for instance, the government had a prize for a while to reward the best failure. And that program in fact was discontinued because it itself was kind of a failure, which is perhaps the ultimate irony.

So engineering a culture of innovation is kind of hard. We have been at it for centuries, and we're very good at it. And we continue to attract talent. And we continue to innovate the process of innovation itself. So you look at Lean Startup, you look at hackathons, you look at Launchpad, you know, all this kind of innovation and the way we do innovation, design thinking; you know, the proximity of the investment process, the innovation process, the design process, this is all very good.

But competitiveness is a national issue, right. And we don't want to become a country of innovation haves and have nots, where there's a veneer of recombinant ideas, capital, and talent that produces great things while the bulk of the workforce which got a crummy education in public schools had no kind of mobility ladders to get retraining. We're locked in a negative spiral of descaling painted character of—rather dismal picture of much of the rest of the innovation system.

Karabell: I'm still stuck on the Singapore example. I can imagine their last meeting was: And the award for best failure is us.

[LAUGHTER]

I think we're going to skip over because I want to go to Vish who wanted to—who has a lot of thoughts about competitiveness and the nature of how does one assess, what is the litmus for one's competitive advantage.

And I think the interesting question there—is it how innovative you are, the greatness of your ideas and the reach of your thoughts and imagination? Or is it literally, what you are creating specifically? The applied side of it. And so maybe you can flesh out that question of where should we actually aim to be most competitive?

Nandlall: Right, I think we tend to conflate innovation and invention. We put it into the same definition in many cases. And I actually think they represent separate things. And it's a combination of the two that I think the U.S. has been very successful in kind of moving the yardsticks forward on their competitiveness.

Let me give you a couple of examples. Invention to me as a measure of the number of patents that you have or a great maelstrom is interesting but it's not intrinsically great in terms of moving along the GDP. It's really about taking that and applying it in the service of a business objective or some type of compelling consumer need.

All right. So if I think about back in, you know, the early part of the 1900s, when Isaac Singer came out with the first commercially successful sewing machine, the invention was interesting, but what was actually compelling was that he actually had an innovative way of selling it. He decided to sell it to women, which there wasn't a lot of targeted selling to women at the time. Then he invented trade-ins and he invented this whole nation of layaway plans. So it's really the measure of how he built the ecosystem around that particular invention that I think created that auto-catalytic process of creating a self-reinforcing cycle of competitiveness for himself.

And if I look kind of at more recent examples, a company like Google, who came out with, you know, this great algorithm page rank to create a definitive way of kind of indexing the Internet, that in and of itself, again, wasn't sustainable enough to really create something that was competitive. It was really the whole way of valuing that through, you know, advertising. So to be able to capitalize on that technology and linking it was a business model which was innovative, right.

So I look at those two things and I say if you look at independent metrics of growth in a particular economy and you take a look at GDP, what they typically measure you on from an innovation perspective, well, here's the number of patents, here's the number of people that are in university, here are the number of investments that you have in venture capital and different companies, I think those are isolated segments that really need to be taken a look at in a whole context versus an independent context, because it's the combination of all those things that actually yields something that's greater than their individual parts.

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I think that's really where the U.S. and coming back to this theme of how does U.S. become competitive, I think we have been able to—I say "we"; I'm actually Canadian so I look at it from an outsider perspective—they have been actually able to embrace because disruptive change as a function of invention and innovation is really the thing that's yielded all the success in the U.S.

The whole great divergence in terms of per capita GDP that occurred between the U.S. and some of the Asian countries I think was manifest simply because the U.S. was able to embrace huge productivity leaps through the Industrial Revolution and all those various embrative disruptive technologies that occurred.

And I think we're seeing convergence simply because there's just I think, you know, a great train wreck of, you know, mass population that effectively will start to yield greater and greater salaries and therefore greater and greater GDP for, you know, the Asian Tigers.

I think what we're going to be able to do, hopefully, is create that next disruptive change by integrating these two inventions in innovation.

And I think by taking a look at where the industry is going today, people are understating the ability of the U.S. to be competitive because you're taking a linear view of where we are today and where some future state will look like maybe 20 years, maybe even 10 years from now. That's absolutely not what has held true in technology or any other field that you look at through the lens of, you know, kind of the U.S. competitiveness, simply because there's an order magnitude change that's going to occur. And whether it's a combination of cloud, mobile, and big data, which will yield that order magnitude change, you can't predict it, right.

I like to think of when I grew up in the '70s, the future was the year 2000. And everybody talked about the year 2000. You talked about the year 2000 all the way up to the '90s. And so in a sense, my future changed or shrank one year for every year that I was living back then. And you kind of ask yourself, why is that? Why is this? Because we knew there was going to be a moment in time where the future was going to change so significantly, but it made no sense to really consider what the future state would look like beyond that, right.

Because there's going to be an order magnitude change. And I actually believe we're in the middle of that today. I think we're in the middle of a change that's going to be so, you know, systemic to the way we consider what the value of goods look like—and there was a great talk by the gentleman from MIT on what does digital goods yield in terms of GDP growth. And I think we're going to see profit pools shift in terms of how do I attack productivity in different segments that we weren't able to attack simply because they didn't have technologies like cloud, right.

So I think the combination of these things are going to move the goalposts a little bit, change the metrics for what innovation and invention looks like and will actually hopefully catapult the U.S. on a different trajectory.

Karabell: So I want to get back to that when we talk a little at the end about where the disconnect might be between what the market values in terms of innovation and what society needs in terms of innovation to be competitive.

But on that, in terms of your experience, Pradeep, having been at two leading universities and now as much as anyone can actually run a university in the ultimate herding cats phenomenon, to what degree are American universities in particular at the core of this question of American competitiveness and our ability in fact to innovate and create going forward?

Khosla: So I think they're really central to this, and to make this point, let me start with what John was talking about the first wave of economic expansion, which is right after World War II.

If you look at what happened right preceding World War II and right after, we had invested a lot in building technologies to win the war. I mean, that was the whole focus. And if you look at where these investments were being made, they were made at universities: MIT, Carnegie Mellon, and Stanford, and you can go down that list.

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And soon after we had finished the war, the idea was to take these technologies and move them to the benefit of mankind and human society. And that saw the emergence of what we think of today as the great American research university.

So this panel is focused on a bunch of negatives--the basis for this panel, second-rate everything—what we forget is the biggest and best infrastructure we have created to create innovation in this country and to create an expanding economy was the great American research university. And that has lasted beyond 60 years.

Where we are right now is we don't quite understand. We take it for granted and we don't quite understand its role in the future of innovation.

And I think we need to take two steps back and rethink the strategy there. We need to go back and ask ourselves some fundamental questions. For example, if you look at Google and think of that not as Google the company, but think of that as Google the company that came out of somebody's Ph.D. thesis and ask yourself, is there any other company in the world in any other country that you can point to with that property? I think you'll be hard-pressed to find a single company in the world. And the reason is not because the rest of the world is not investing in these technologies, not because they are bad universities. They lack a fundamental culture. They lack a fundamental understanding of combining education with public policy, with tech transfer and creating an ecosystem that kind of supports itself and keeps on feeding on itself.

And my problem sitting here today is that this country has lost track of that because of various economic contingencies that have arisen and we are thinking of research more as—how shall I say this? It's not considered to be to the benefit of mankind or humanity. It's more the fun thing to do and there's no real impact. So we need to go back two steps and fix that thinking that we have.

Karabell: Does that mean more funding for theoretical research rather than the current funding matrix, which goes much more toward the creation of patents and the generation of income?

Khosla: So I don't know if it—if I would argue more funding for theoretical research, but I would argue that focusing all funding on near-term applications is actually a mistake because—so let me give you an example. Nanotubes. When we discovered nanotechnology and the phenomena of buckyballs and nanotubes, there really was no real application for nanotubes.

But very recently—and this is like going back 10, 15 years. And one would say: Why the hell are you investing money in nanotubes? Who cares? Guess what, I just saw technology very recently where somebody has taken nanotubes and built a silicon chip to replace a retina where now you can replace the rods and cones in your eyes. And this is done with dynamic bandwidth variation so you can determine what bandwidth of light you want to be able to see. So now you can see the \$6 Million Man being created. It is 100 times the density of the rods and cones in your eyes, so now your density, your perception is better than what a camera lens with a camera would do. And now you're talking about—so if you look at this, it's going to have a big difference, make a big impact on people with congenital blindness, people who are going blind because of age, people who are born blind.

At the same time, this was created based on basic research for which you would have thought there is no real value. And you can go back to laser. You can go back to transition. I think there has to be a balance and one cannot shift the pendulum.

My fear is we are treating science like we are treating politics. There are extreme swings between Ds and Rs and left wings and right wings and there is forgotten value of right in the middle, where you want to balance both sides of science and technology and patents.

Karabell: John.

Kao: So the comment about research universities I think mirrors a larger issue, which is that innovation is a complex phenomenon and it's got a kind of almost a value-chain quality to it. And if you think about it in a linear way, as old-fashioned

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policy makers and policy makers in a lot of countries do, you get stuck in this notion of you fund basic science and then somehow out the other end will come valuable innovation. So it's money into knowledge, knowledge into money, hopefully, you know. We'll see.

And I think that from where I sit, the evolution of the research university is very much not just to cover the phase of discovery, but also the phase of application, the phase of entrepreneurship, the phase even of scaling up and ultimately of some kind of societal and/or economic relevance.

And so, you know, instead of being a linear sequence, it's kind of a set of circularities, in a sense, that makes it work in society but also suggests where the research university of the future needs to be in this value chain.

You know, I was in Moscow last week and I was visiting the Skolkovo Foundation, and these people were speaking about the urgent need to fund basic science and to make good use of all of the cities that are sprinkled all throughout the former Soviet Union and now are trying to find their place in the value chain.

Well, you know, again, if you spend a lot of money on basic science without having scientists participate in this hybrid culture of basic science, curiosity-driven science on the one hand but societal responsibility on the other, there are certain, you know, I think kind of inefficiencies that might result.

Now, the reason that I think it's important to recall this set of phases or this kind of value chain notion of innovation is because from a U.S. competitiveness point of view, you know if the body begins to whither in terms of trained workforce, infrastructure, economic manufacturing models, failure to apply the fruits of innovation that come out of Palo Alto and Cambridge, Mass., and so forth and so on, you know, we do run the risk of kind of devolving into being kind of a national ideo with a whole bunch of talented, extremely well-paid people who get to go public or do private placements where the fruits then go to people who are better at the entrepreneurial process, not going to happen for a while. The scaling process, arguably other people are getting better at that as we speak. And then marketing and kind of local societal relevance.

And so, you know, we really need to watch, when we talk about innovation and competitiveness, what the complexion of this is likely to look like and how we can avoid simply being an island of innovation amid this larger world.

Karabell: I like the ideo analogy, young people everywhere dreaming one day of inventing the Swiffer.

I want to channel for one moment Padma, not because I have learned how to channel human energy, but because I have an iPhone and she sent me an email.

So her thoughts, which were kind of piggybacking a little bit on Pradeep's about the role of education, had to do with the competitive advantage of the United States as an innovation center drawing students, particularly graduate students but undergraduate, around the world to become innovation hubs. And obviously, this panel, if it would have had included Padma, would have been Exhibit A for that, in that all of you are either first- or second-generation students who came to North America, or your parents, and have then stayed to be productive. This is a place of choice.

So 40 of the top universities in the world as measured, whatever that metric is, are still American. 60 percent of all Nobel Prizes have been to U.S. scholars. The largest number of foreign students in the world still come to the United States, 21 percent of all foreign students in the world.

And she actually pointed out that MIT-affiliated companies coming out of doctoral programs or graduate work have generated \$250 billion of value, and Stanford about the same.

So I guess the question there is—that certainly looks good. Are there issues about the continued competitive position of the United States as an innovation center as tied, for instance, to immigration policy and visas?

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Khosla: I think there's a very serious issue because there's two things going on. One is we are becoming more and more inward looking at our immigration policies changing. I'll come to that in a second.

But an equally important issue is that the standard of living in other countries like China and India and Eastern Europe—and you can just go down the list—is expanding, is improving at a much faster pace than the U.S. standard of living is right now. So there is a tendency for people to be closer to their families, to be involved with their country and to live there. So there is some resistance to coming here to begin with.

And then the fact that our immigration policies are so messed up, where the talent-based immigration that existed pre-World War II, beginning in the 1940s, 1950s, to where we are today, where we are trying to treat immigration as one single strategy for—an egalitarian strategy for anybody from any country regardless of their education level, it doesn't quite make sense to me. I think Craig Barrett about 7 or 8 years ago had the best idea. We should actually give literally immigrant visas to every highly qualified person who wants to live in this country.

Secondly, the problem—there's an economic issue out here. We talk about the cost of education in this country, so I kind of disagree with that. But let me just give it to you that the cost of undergraduate education is way too high, as evidenced by the trillion-dollar loan.

If you were thinking about implicit outsourcing, why would you then not just say let the Indians and the Chinese spend money on undergrad education? We would focus on graduate education, we'd bring all these people out here and give them the opportunity to live here, make a good life, create all the technologies, all the companies, all the jobs, own all the IP and export it back. But somehow this would be a bad thing for a chancellor of a university to say, so I did not say this. I was just thinking it.

[LAUGHTER]

Karabell: Hypothetically. If a chancellor of a university were to think about a possible future, what might it look like?

[LAUGHTER]

Khosla: Right. So I think we need to fix immigration.

Karabell: I mean, Vish, do you find this an issue in terms of recruiting talent, hiring, retaining, or is Ericsson and other companies you've been at so global at this point that you can kind of place people where they need to be and, therefore, that's not really a national innovation issue?

Nandlall: Yeah, it's hard to kind of overlay political boundaries on top of corporate structure in many cases, especially if you have a global corporation. I'll meet with a number of different innovation hubs within Silicon Valley, and inevitably they are led by somebody from India. Inevitably, that person is not actually a graduate from an American university. In fact, they're a graduate from an Indian university. And whether or not that craters their ability to drive and create innovation outside the U.S. or inside the U.S. is, you know, maybe less of an issue from, you know, a company like an Ericsson at the end of the day.

Karabell: So I am going to ask two questions before we go to the audience. One is to push back on these sort of presumptions, which is there's a fine line between anxiety about the future and your national place within it that leads you to a sense of urgency about making necessary changes and a level of anxiety that numbs you to the possibility of making those changes because you have decided that things are simply heading down.

And, I mean, there is this viable question about Americans do compare things like engineering degrees, patents generated, and when they start looking at national tables, thinking that the relative position has slipped, relative to China or relative to India, and that this is a negative harbinger of the competitive position of the U.S.

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But it may be that between open source and the kind of innovation we're talking about which may not follow quite the same form as before, that we shouldn't be generating so many engineers and we don't need the kind of patent—the same kinds of patent protection that would have been applied before. And that we are kind of manufacturing a crisis. I mean, it's fine to manufacture a crisis again if that spurs you to continued creativity.

Do you have any—is there any merit in that view? Or am I being too rosy?

Khosla: I don't know.

I think depending on the context there is some merit. But overall, I think we might be manufacturing a crisis more than the crisis already existing.

But with that said, I think we are on our way to making this a crisis. So we may not be at the critical point right now, but I think we are pretty well on our way. And this is where I think we have to rethink American higher education, the role of the universities. You know, we talk a lot about the online education. IT is going to disrupt education. And we never take a step back and ask ourselves, what is the role of—what is the role of education? What is the role of attending—goal of attending a university?

It is not just access to content. That I can do on the web. It is access to different modes of thinking, which you get access to by interacting with multiple people, by top-rank faculty. It is—Ray talked about the neocortex and how it's pattern recognition defined at various levels of abstraction. When you take multiple courses, look at—go through a program, which is engineering, let's say, but you are taking courses in arts and the humanities, your brain is developing in ways—it's building algorithms, ways of thinking in ways that I don't believe you can build just by going on the web and looking at Wikipedia and understanding what nanotech is or what nanotubes are all about.

So I think there's a bigger role that is being overlooked and underestimated. I'm not saying technology will not disrupt education. It will. It should. But it will not displace the current mode of education totally. It has to augment what we are doing.

At the end of the day, we've got to put our students, just like the two young men out here before, who are left- and right-bend oriented, who are going to work, use both sides of their brain to solve complex problems that involve technology, science, policy, economics—you can go down the list—work with people across multiple disciplines. And in that context, I think the universities have to rethink what they are doing.

Karabell: John, is there anyone who does innovation nationally better? And I'm not sure Finland or Singapore are good correlates, in that, you know, countries of 3 million, 4 million people, it's kind of like saying you could compare them to Silicon Valley. I'm not sure you could compare them to the United States.

Kao: Well, when you say do, I assume you mean at a national policy level. And I think every country is different. I mean, I think, you know, America probably does at least badly in that respect. But I think that the room for improvement is infinitely large.

I mean, the interesting thing about what's going on in the world now is that these 50 countries are all laboratories for trying to figure out the cause-and-effect nature of making conscious and intentional investments in innovation capability, infrastructure and results.

Karabell: So many questions, so little time. Let's go to the audience and right here.

Jody Westby, Global Cyber Risk: Pradeep, you went out to countries around the world and set up cylab campuses and brought your Carnegie Mellon curriculum to those countries, and I'm really intrigued with this edX and MITx and the online programs that are now available to people in developing countries and all over the world.

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And so does that—is that going to obviate the need for us to continue to reach out to other countries and have learning capabilities there? Or will it give us an opportunity to tap into innovative resources in those countries? And should we be reaching out to them and trying to innovate more globally than just, oh, let's bring everybody here and give them a green card when they graduate?

Khosla: That's a good question. So I think if our goal was just content delivery, it would obviate the need. But that's not the goal. The goal is to bring American-style education, let's say, to India. And in that local neighborhood, to tap—or to create an ecosystem which is a micro-ecosystem of what we have out here and then tap into talent right there, because not everybody in the world wants to move to the U.S. And even if they did, this country cannot handle 7 billion people right now.

So we need to be able to build those economies, but at the same time, do it in a way that we kind of partly enable them and partly are the beneficiary of what they are creating. Because we, as a country, cannot afford to invest in R&D for the rest of the world, which is what we've been doing up until now. The rest of the world has to wake up and start investing in their own R&D and the benefits have to accrue back to us somehow.

So that was my way of saying there is a way for us to bring something back home. It hasn't happened. Hopefully, it will.

Karabell: Over here. Sir. Sorry. I saw her. I didn't see you.

Chenyang Xiu: I am actually heading Siemens technology-to-business center in Berkeley. I think that this caution on the panel has been focusing on the challenge of today. I'm actually serving on the UC Berkeley EECS Industrial Advisory Board. I want to play a different question to the panel.

Our last meeting we had the chair play the thought-provoking questions, saying UC Berkeley EECS together with Stanford and MIT has been number one in EECS for the last 50 years. And if you ask because the great top 40 research universities have powered the U.S.'s unprecedented growth in terms of knowledge, application, and commercialization and be the innovation country of the world.

The question the chair played to the advisory board is, 'How can UC Berkeley EECS stay at the top of the game in the next 50 years in the presence of extreme changes in terms of requirement, in terms of education, in terms of research, in terms of societal needs, but also globalization in terms of the investment in the research, very aggressively more not from what I call the emerging country, but these emerging country really are the growth countries of the next 50 years?'

So how are the great research universities of the United States to stay competitive the next 50 years? So I would like to play this question to you. I'm not going to share with you what advisory board said about UC Berkeley, but I want to hear the panel talk about overall how U.S. university will compete in the changing world.

Khosla: So I can take a quick crack at it. So if you look at what makes a university great, it is people. It is great students coming in and interacting with each other, educated, trained, mentored by great faculty. Then all of these things take resources. So investment and research by this country is going to be significant.

Secondly, I think to bring great students onboard, we have to realize that intelligence and talent is equally distributed in socioeconomic strata, in ethnicities, in racial, people of different races, different origins have the same property of having genius people there.

That means we have to be able to admit people and educate people without regard to their ability to pay. And this is a big if, whether we can do it. The greatness of some of the great universities has been that they can do it because of their endowments. But the public universities are going to lose that edge because the public disinvestment in education is growing at a much rapid pace, much more than I'd like to see.

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Bhaskar Chakravorti: I'm a senior associate dean at the Fletcher School at Tufts. My interest is in the geopolitics of innovation. The question I'd like to put to the panel starts with the following observation: I feel that this whole idea of competitiveness is somewhat outmoded. We're talking about universities where a leading research university has a chancellor who is a recent immigrant to this country. We talked about Google, which is founded by—you know, cofounded by an immigrant from another country.

So essentially, the great institutions we are talking about, whether it's the universities or the companies, they themselves draw upon global talent.

So the question is, what do we mean by U.S. competitiveness? The U.S. itself is just a political entity. So the question is, does politics make a difference? The fact that right now we don't have the equivalent of a Cold War, which in the past had funded a lot of foundational innovation, foundational research. The fact that we don't have that, is that a crisis? And is that what is potentially causing us to, you know, kind of figure out where is the money going to come from that's going to feed the next Bell Labs, the next Xerox, the next MITs and Stanfords and the great research universities of the world?

Karabell: I mean, I think it's a great question. Does national competitiveness really matter? Let's hear it.

Kao: There's no doubt in my mind that looking at the globe from an innovation economy point of view changes—has to change our notions of competitiveness. I mean, the old-fashioned, almost mercantile notion of I win, you lose doesn't necessarily apply in an innovation economy where sharing ideas leads to the multiplication of opportunities and where, in a sense, these days to innovate at scale requires a global perspective. Because the value chains for innovation in specific industries are now splayed out across the entire world. So, you know, you have countries that specialize in certain kinds of research or certain kinds of clinical trials or certain kinds of applied R&D. And it's the systems integration function that actually can weave them together.

And furthermore, if you followed the thread of reverse innovation and the notion that, you know, poorer societies are rich in one thing, from an innovation perspective, which is problem ownership, then you have to have eyes on countries around the world. You have to be thinking about weaving resources and challenges together into a new model of value creation that is very far away from the old notion of, you know, finite games, which is, you know, we play until someone wins as opposed to what we might call infinite or have been called infinite games, which is we play to stay in the game and to hopefully make the world a better place.

Khosla: Can I make a quick comment? So I think I want to say two things. U.S. competitiveness means people like me and you and everybody out here who have made a commitment to this country, to live here, to make sure that we are creating economic wealth that allows us to have a standard of living much different than the rest of the world.

Secondly, I see what you are saying, we don't have a Cold War. But I would postulate that we have the beginning of a Cold War. If you look at this country, 8 percent unemployment is an unsustainable number. The difference between haves and have nots is unsustainable right now and growing faster.

But forget this country. Between this country and the rest of the world, the gap of their standard of living between ours and the two gaps is closing really fast. And that is not making us feel very comfortable.

So there is a war. It is not a cold nuclear war where we are trying to kill each other, but there is a war where we are trying to fight for a standard of life, for a space around us. And I think you cannot discount that and you cannot think of that as a great situation because we should be thinking of this as a war.

And innovation is the means that we are using to fight this war. And whoever wins that battle is going to win the war, I think.

Karabell: Vish, do you have a closing thought?

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Nandall: Yeah, I mean, I think corporations aren't going to think in terms of nation states. And I think in a globalization, in the terms of a corporation is really how successful that corporation is going to be.

And I'm wondering if that blurs the line. If I think of, you know, Apple as a great example. Apple has 50,000 workers and there's corporate structure. And, you know, the whole manufacturing arm of Apple is Foxconn in China. They have a million people. And so there's asymmetry in terms of these integrators who have taken the intellectual side of the equation in terms of industrial design, in terms of what the gui and the interfaces need to be and the actual manufacturing side of low-cost wages in Foxconn, which is employing so many millions of people at the end of the day.

I think what we need to figure out is—and I think to your point earlier is—how do you equalize that so that there's employment for all in North America? Whether that's through education or whether it's as we transform our economy and measure it in a way that's much more geared toward the globalization of technology, I think we have yet to get there.

Karabell: Well, we have obviously left more questions than not, so I think everyone should take their second-class cell phone service to do a first-class Twitter feed and blog to answer the questions that we have raised. Thank you very much.

[APPLAUSE]

Kirkpatrick: Pradeep, John, Zachary.

Yeah, and then the fact of that company that has—is using that outsource that has the million jobs itself has over \$100 billion in cash it's sitting on is an interesting other fact to think about.