AI, Robotics and the Obligation of Business

Speakers:

Andrew Anagnost, CEO, Autodesk

Moderator:

David Kirkpatrick, Chief Techonomist, Techonomy

(Transcription by RA Fisher Ink)

Kirkpatrick: And this is the end of the day now, but don't leave because Andrew Anagnost is the quite amazing, new CEO of Autodesk. And I've just been so interested to get to know him a little bit on the phone and briefly here, and I think you're going to see why.

Autodesk is a company that makes software to make things, basically. Is that a fair summary?

Anagnost: That's what we do, design and make things.

Kirkpatrick: And so because of that, you seem to have given a lot of thought—well, you've been there since '97, so even though you just became CEO, you've been there. You know what this company's all about and you've clearly been thinking about some of these big issues that we've already touched on here, notably, this issue of the future of jobs and how automation will affect everything. So maybe I should let you kind of riff a little bit on that topic since you are quite eloquent, and don't let me down on that.

Anagnost: [LAUGHS] Well, you know, there's a couple of ways of looking at this. First, let's talk philosophically. We're moving into an age of automation. And we as tech companies, we have a responsibility to do this ethically, morally, and in a way that benefits society.

Kirkpatrick: To move into an automated society.

Anagnost: Yes. To move into this new whatever you want to call it, the new machine-human society, whatever you want to call it. There's a few simple rules you can follow. First off, you've got to remember that the end user is the customer. And a lot of the ills that we were talking about earlier today which people were so passionately discussing is that Silicon Valley in some parts has forgotten who the customer is. We do great things when we focus on the end user as the customer.

The other thing that's super important is we've got to deploy this technology to solve some fundamental capacity problem, either an economic capacity problem, a social capacity problem, or, frankly, an environmental capacity problem. And that's one of the areas that you and I can talk about a little bit.

But the last piece is we have to stand up and be realistic that we have a moral responsibility to help people in what I like to call the valley of dread. And you simply draw your favorite S-curve, right? There's this period where new technologies are coming up and jobs are being created, but at the same time, you're undoing some other economy. And there's this valley of dread. We've been talking about it for a while. There's going to be new jobs on the other side. I am a techno-optimist, a little grumpy one, but I'm a techno-optimist. And there are going to be more jobs, more things to do on the other side. But there is this reality that there's a group that's struggling during this transition that we as providers of technology have to pay attention to.

Kirkpatrick: Okay, that's a really good way to think of it. But another thing I want to get on the table as we continue discussing various aspects of what you do and what you hope to see is this point you make about, you know, the global middle class is not going to get smaller, right?

Anagnost: This is the capacity problem. So you and I had talked about this on the phone. Look, we're moving to a world—look at your favorite prediction, 2050, 10 billion people in the world. Ten billion people in the world. We don't have enough infrastructure to support those people. In the developed world, cities are not able to provide the capacity for this population. In the developing world, there's simply not enough roads and bridges to provide capabilities for these people to have the mobility they need.

Kirkpatrick: Not to mention homes.

Anagnost: Exactly. And by the way, there's one stat to kind of fulfill that capacity, we literally have to build 1,000 buildings a day over the next 33 years. A thousand buildings a day.

Kirkpatrick: A thousand buildings a day for 33 years.

Anagnost: We can't do that. And the other thing is, back to this middle class, if we're going to move to a world with 10 billion people, we want to have a vibrant, healthy, and productive middle class. If we don't, we're either going to have—

Kirkpatrick: You mean globally.

Anagnost: Globally.

Kirkpatrick: Yes.

Anagnost: Sure. We're either going to have war, we're going to have famine, or we're going to have pestilence. It's that simple. So we're not going to get to 10 billion if we don't have a

vibrant—and we can debate if we should get to 10 billion or if we will get to 10 billion, but that's not the point.

Kirkpatrick: But they're all going to have to be in the middle class, however many there are.

Anagnost: So fundamentally, we have a major capacity problem because that middle class, they're going to want more things, right? So we can sit here arrogantly in the developed world and say, "Well, they should just redefine their expectations of consumerism." But is that fair or is that just us being parental or worse?

Kirkpatrick: Imperialistic, it could be called, actually.

Anagnost: They're going to want the same things. They're going to want their refrigerators, their washing machines, their cellphones. They're going to want their conveniences. We cannot build all these things that are needed right now. And frankly, the world can't support the capacity needs that we have right now. Why can't we apply the automation to really make it possible to do all this more, do it better, but do it with a lot less impact?

Kirkpatrick: One of the things that I really like about you as the CEO of a creation software company talking like this is you see this as a virtue for the world that's inarguable. You also see the opportunity that you could really make a lot of money to help it make it happen. But this also is very much in line with Techonomy's embrace of the sustainable development goals because this is why it makes so much sense. We can consciously start working towards really remedying the problems of the world without disadvantaging business necessarily.

Anagnost: I fundamentally believe that.

Kirkpatrick: I hate win-win, I hate that phrase, but the fact is, I love listening to a CEO like you who's put it together in the context of your business.

Anagnost: Yes, absolutely. This is just good business. Like I said, more is inevitable. This isn't going away. We can pretend it's going away, we can pretend there isn't going to be more. More is inevitable. Artificial intelligence, machine learning, robotics, all these algorithms, this is going to help us absorb this capacity without destroying the planet simultaneously. Imagine a world where instead of building one project for $10 billion, you build 10. Imagine a world where urban areas are continually renewing themselves through automation and application of automation technology. These kinds of efforts are actually going to employ more people and they're going to create more good and more sustainable development in the world than we have today.

I'll give you an example. We were talking about construction earlier and how wasteful—

Kirkpatrick: Very relevant to this discussion, obviously.

Anagnost: Completely relevant. Do you know what? Eighty percent of those bad decisions that create outcomes in a construction project are locked in very early in the processes. It's the decisions people make. What materials am I going to use? What's the complexity and shape of the design? Architects used to dare construction companies to build the building they were designing. What sustainable choices have I made? Have I been able to do a full systems analysis of the energy consumption and use of this building? These are hard things to do today. People punt on most of this in the early cycle. If you can automate the decision-making process for people early on in the cycle, give them options, help them understand what they can or should do early on in the designs, you can actually help create much more sustainable, better outcomes for the world by providing the information to the end user making the decisions.

Kirkpatrick: Okay. And back to the sort of sociocultural implications, you talk about this valley of dread. But let's just assume we have some way of helping train and prepare people to do the new kinds of work. You're saying there are going to be many, many more things made, even if, as we heard in the construction panel, a typical project requires fewer people. So you don't see productivity improvements that we hope—Michael? Where's Michael? Productivity guy—will happen because of automation and robotics and AI, that's not going to cause us to have a net decline in employment in your analysis.

Anagnost: Look, like I said, I'm a techno-optimist. The curve and arch of history says that on the other side of these changes you actually create more jobs. You might say, okay, so where are the jobs going to come from? Part of the jobs are going to come from building, servicing, and deploying the infrastructure of automation that builds things. Another part of the jobs are going to come from the simple fact that it's going to cost less to build something. And frankly, the ability to build increasingly complex things is going to be in the hands of more people. And we have to fundamentally recognize this. People are dealing with these things right now. More people are going to be building things. The world of the monolithic manufacturer that owns a large factory that builds and produces something in volume are coming to an end over the next 20 to 30 years. The means of production will be more distributed and that is going to fundamentally change the number of people making things.

Kirkpatrick: Are you thinking of things like 3-D printing or analogous things?

Anagnost: It's what we like to call the automated micro factory of the future. And yes, 3-D printing is part of it. There are companies out there right now for low volume things doing amazing things with 3-D printing. What it does is it removes all the complexity out of figuring out what you have to build. Now, these things are not working at volume yet. They haven't figured out all the materials, problems, but they're going to. And it's going to be over this next 30 years that we're going to see this. And that's going to fundamentally change the access to building. Construction. Construction's industrializing. The product manufacturing world figured out a long time ago how to build products highly efficiently and at volume with minimal waste. You heard how much waste there is in construction. Construction's amazing. It accounts for 40

percent of the materials being used in the world and just in the U.S. alone, it accounts for 170 million tons of waste every year in landfills.

Kirkpatrick: Wow.

Anagnost: In an industrialized construction world, imagine a world where you are—like you heard earlier—you're designing, assembling, manufacturing buildings on site. They're still as beautiful and as compelling as they were before, but they're precision made rather than willy-nilly assembled at the construction site. That is possible, and automation and these tools will get us there. And yes, there will be more people making things. And there will be more people designing new types of machines. And I'll also tell you—and this might sound a little nutty—when you drive down the cost of doing things, smart people fill the vacuum and they create whole new industries.

And if you want to talk about nutty, okay, I'll just be nutty for a minute. Humankind has always been great when we're at the frontier of something. When we're out there expanding and enhancing our frontiers. We've run out of frontiers on the planet. We're using up everything that's here.

Kirkpatrick: You mean physically, yes.

Anagnost: Physically. What if in a world where we've automated the means of making so precisely—we are actually able, as Elon Musk likes to say, to expand and become a multi-planet species? What will that do fundamentally to the economic opportunity of this world? None of us know. What kind of new industries will it create? None of us know. It's certainly a possibility when you've driven the cost of making things down to a level where more and more people can innovate. I am an optimist.

Kirkpatrick: Let's stick back to this point about the attitudes of your peer technology companies. Just to ask you a question that I've asked others on this stage, and pronounced upon myself, this idea of a basic income is a trendy prescription for the perceived world of the future where jobs disappear. What's your view on that?

Anagnost: Yes, this is where I was wondering if you were going to ask me this. Look, I hate that idea. I think it's classic elitist mumbo jumbo. It's like, hey, so we're going to automate all your stuff away and leave you as a permanent serf class. How's that sound to you?

[LAUGHTER]

Do you like being the permanent serf class? So don't worry. We've got your back. We're going to make sure that you can feed and clothe yourself, but there will be no opportunity for you. Bullshit! I mean, honestly, is that the best we can do with Silicon Valley? I think we can do a lot better than that. I think we can paint a picture of where people are doing more things. And

actually, I think we have an ethical responsibility to deploy these automations to ensure that does happen.

Kirkpatrick: Okay. I'm looking if anybody wants to throw something in. Michael—ah, Mr. Productivity. Okay, is it a productivity question?

Anagnost: Nobody's answered your question yet, by the way. There's something about the question though that I—you know, statistics, averages, they're such an annoying thing, right? And one of things I think—nobody said it and I couldn't quite figure it out. It's not that productivity is flat on the average. It's that the benefits of productivity in the new technology age are unevenly distributed. You look at the major urban areas, especially on the coasts, they're actually seeing benefits of productivity. But what's happening is the diffusion of technology is not getting to other places in the country. So the net result is there is this kind of gross inequality of the benefits of productivity and automation and it's feeding and driving down the averages. So averages are a stupid thing for us to look at. Let's look at what's actually happening in the country and why we have this rage that's going across the entire country from end to end. It's because the benefits have been unevenly distributed. And I was surprised nobody said that.

Kirkpatrick: So your other question has asked itself. But what one are you going to ask now?

Audience: Thank you for answering the real question. But in the meantime, where do you see, since you're the relatively new CEO of Autodesk, what do you see Autodesk doing differently over the next three to five years?

Anagnost: So over the next three to five years, there's a couple of things we're going to be doing differently. We're going to be making sure that some of the automation tools and automation capabilities that are going to be changing the way these people work show up close to the applications they're using today. So the end users are our customers. The people that actually build things are our customers and we want them to be exposed incrementally, and sometimes not so incrementally, to things that are going to represent the way they work in the future. We're doing that progressively with things like we call generative design, which are algorithms that we deploy that kind of create computer-generated options for people to review. We're trying to inject those into the ecosystem so people can understand that this isn't the computer taking away your job, it's the computer enhancing your capability to make better decisions.

So that's one thing we're going to be doing and we're going to be exposing that to people that already pay us money, not just people that pay us new money. The other thing we have to do is we have to limit the friction to access some of this technology. We're a 35-year-old company. We've got a legacy that's maybe not quite as lickety-split digital as other companies might be. So we've got to get the friction out of the system to get some of these capabilities to these customers as quickly as possible, be much more digital.

But really what you're going to see us doing over the next three to five years is be active participants in this reimagining of manufacturing and construction for the betterment of everybody and for the betterment of our customers. We are absolutely going to be active participants in it. We are now, but we will be indisputably deeper, more active participants and I'll tell you why. In the future, what will happen is these 3-D models that all of our customers create, these become the currency of the processes. Both in manufacturing—it's already happening in manufacturing, but they're going to become the currency of these processes in construction as well. People will be using these beautiful 3-D models to make all the decisions throughout the entire process. It's going to look just like what happened in manufacturing. And that's where we'll be spending a lot of our time innovating.

Kirkpatrick: Wow, cool. Okay.

Audience: John from Hyundai Motors. On the topic of AI robotics obligation of business, I don't hear many other CEOs, leaders like you, and how do you get together to talk about, I think it's a really important topic.

Anagnost: I have no idea. [LAUGHS] I'm assuming there's some that feel as passionately about this as I do. If you're out there watching this right now, give me a call. You can send me an email, Andrew.Anagnost@Autodesk.com. Happy to have a deeper conversation about it.

Kirkpatrick: I hope you do. I hope you make it into a CEO movement and technology industry movement.

Audience: Love the idea that we can empower consumers to become builders, that building becomes democratized. What changes do you think are necessary to education and/or public awareness so that the human element can capitalize on the vision you're talking about?

Anagnost: So this is a big deal. This a part of the policy piece too. So we're doing our part, but we can't do all of this. We are failing, in the U.S. in particular, but I'm not sure—you know, I can't really find anywhere in the world that's doing it particularly well. We are failing to educate people for the new world. The new world is going to require a lot more adaptability, a lot more resiliency, and a lot more community focus on responding and adapting to change. We have to revamp our educational system. I love the comments that were being made earlier about, hey, you know what, an admin assistant should not have a bachelor's degree in her job description. That's absolutely ridiculous. We've got to start respecting the trades again and the skills associated with trades. We absolutely need to create this new—I don't care what you want to call it—gray collar class. There's all these phrases that are out there right now. We have to respect these people who are tradespeople by profession and will be tradespeople their entire life and we have to build an educational system that supports their adaptability, their resiliency, and helps support the communities where we need these things.

That is a political problem. Companies can't solve that. I will tell you some of the things we are doing. We don't charge for our software education. We don't make a dime off of education. All of our software goes to educational institutions for free. Every single bit of our tech, even the compute-intensive tech.

Kirkpatrick: Wow.

Anagnost: Which is causing us some problems from time to time, especially during final season with student projects.

Kirkpatrick: You mean cloud kind of stuff.

Anagnost: Yes. But that's the commitment we're making. We're also making commitments to other types of resiliency trainings. And personally, I want to find people that we can engage with, with our foundation that are actually making a difference in some of these distressed communities, the communities where technology has left them behind. There are people in these communities that absolutely know what the right answer is for their communities. I want to understand what those people need from tech companies like us.

Kirkpatrick: Okay, quickly there and then come up here—

Audience: Andrew, very interesting discussion. Curious, for you personally as a leader, how are you preparing yourself, or how do you prepare yourself to address just the massive amount of change that you face or that you're trying to drive? How are you equipping yourself to answer the very tough questions around what to do with AI and things like that?

Anagnost: You know, I've always believed that you have to get your facts straight and do a lot of scholarship. So I'm personally equipping myself by knowing as much as I need to know about what's actually happening as opposed to what people are saying are happening. But I also think courage is an important part for leaders in this whole transition. You have to be courageous to say the things that need to be broken in the industries you serve or in the tech industry in general in order for this to work for everyone.

So I'm doing the scholarship that I need to do to make sure I understand the issue in depth. I already kind of did because I've been immersed in this, but I'm also trying to take courageous stands that I think are important in terms of moving the dialog forward within the tech community. We have to have empathy for the impact that this is having on society. I think there is a better future out there, but just telling people there's going to be a better future without empathetically pursuing dialog on the topic isn't going to solve anything.

Kirkpatrick: Wow, that's great. Oh, okay, back there and then here.

Anagnost: Aren't you going to tell me—ask me if Facebook should be regulated?

Kirkpatrick: Okay, we'll get to that. Here. Okay.

[LAUGHTER]

Pratt: Yes. Steve Pratt, Noodle.ai. I spent a lot of time recently in developing AI algorithms, machine learning, and the breakthrough in computing power, like with NVIDIA's recent DGX-1 that has petaflop computing power is creating tremendous breakthroughs in the ability to manage businesses. And you talked about 170 million tons of goods sitting in warehouses, right?

Kirkpatrick: Landfills.

Pratt: In landfills, right. Even worse. So we see, what, a trillion dollars in wasted working capital because the business planning processes are so inefficient. And because people aren't good at planning because they don't have the data, they just put more things in warehouses. So I would like to see a future where you actually don't have distribution centers, where we take—you can imagine all the materials, all the water and trees and everything that is sitting in these warehouses all over the world and just eliminate them. And I think I would posit, and I'm curious to get your opinion, that as companies get more and more data, they actually have an ethical responsibility to use those data to reduce inventories. Because if we're going to have 10 billion people, we can't be filling up warehouses with materials. We need to get rid of that and actually take that materials and actually help people, as opposed to just have lazy business decisions.

Kirkpatrick: That was a great comment. I don't think you even need to respond.

Anagnost: I actually agree with him. [LAUGHS]

Kirkpatrick: How could you not? That was a really good thing to say. Okay.

Audience: Hi, Andrew. I admire what you guys are doing. I'm Carlos from LogicInk. And my question is about your comment about reducing barriers of entry to help promote a more sustainable world. So in that context, should Autodesk tools be known to homeowners or car owners or anybody who's not necessarily a designer, not necessarily the architect, but by being informed by those choices of what they're doing, could help make that world more sustainable?

Anagnost: Probably. Right now, I really, really want to focus intensely on these people who are making these super important decisions in the process. I think as the barrier in complexity of using these tools goes down over time, more people will have access to them, but that's a tough nut to crack. I think we'll get there, especially with some of these machine-assisted algorithms where we're able to give people options, we'll actually push the tools further and further closer to people. We tried to do that before. We found out the problem's pretty tough, but I think we will get there eventually. But right now, let's start with the hardcore professionals.

Kirkpatrick: Okay, we do have to wrap, but since you asked me to ask you this, should Face—

Anagnost: I didn't ask you to, I was surprised you didn't.

Kirkpatrick: Should Facebook be regulated?

Anagnost: Well, let me answer it this way. So I—there's a lot of anger about fake news and the kind of things about fake news. And I told you, I've been off Facebook for years.

Kirkpatrick: Yes, you did.

Anagnost: And I think the thing that you really should be angry about—look, fake news has been with us for ages. When I was a kid, it was called the *National Enquirer*. And I actually knew—

Kirkpatrick: It's still called that, but go ahead.

Anagnost: I knew people who really believed that we were living with aliens. And it's been here—

Kirkpatrick: That guy's a good friend of Trump's that publishes the *National Enquirer*.

Anagnost: And by the way, I loved it that I knew people that believed we were living with aliens. And I have to think you have to be really angry about, and the reason I've been off Facebook for years, is that—it's not the fake news, it's the efficiency with which these platforms are able to distribute this information and vulcanize social discourse in this country. This should be scaring the crap out of you. That's what's going on. That's what's scary.

So we've now got two huge companies in Silicon Valley that are not really tech companies anymore. They're media companies. And you are not the end user, you are the product. And these companies are not even regulated to the same standards as television was in the days of television. That's just ridiculous. Okay, so that kind of, sort of answers where I sit on this issue. But I think there's—

[LAUGHTER]

Kirkpatrick: I'm glad that you asked yourself that.

Anagnost: But I think there's something a little bit more fundamental here. I was going to make some comment that Facebook's the new boob tube. For those of you who are of a certain age, you know what that phrase means. [LAUGHS] And it is, right? But it's not regulated like it was back in the '70s when we were all calling the television the idiot tube.

Kirkpatrick: Yes, well couch potatoes now walk around on the street holding a screen in front of them, basically. They're getting a little exercise maybe, but—

Anagnost: But the other insidious thing here, and I think this is super important for all of us— you know, it all comes down to leveling the playing field too. You know, Europe's got this partly right. I don't know if the European woman is here.

Kirkpatrick: Christiane. I don't know if she's in the room.

Anagnost: All right. I don't know of GDPR's got it all right. There's a lot of limits to American technology diffusion into Europe in that regulation, but they've got a bunch of it right. And I think all of us should be fundamentally concerned. If you want to make sure tech companies are treating you as the user and not the product, then we've got to do something about privacy. We've got to stop being so complacent and so willing to forfeit so much of our own personal information to be able to find out how to get to the nearest Starbucks. There's something inherently troubling about this.

Kirkpatrick: Yes, that was really good. This is your first public appearance as CEO, right?

Anagnost: It is.

Kirkpatrick: Yes. Okay, I think there are going to be more because you say interesting things.

[LAUGHTER]

And it makes me feel very optimistic about Autodesk's future, a lot of things you're saying. So and thank you for being outspoken on these things. I don't agree with every word you say, but I really, really like the way you're talking, and we want to stay close to you at Techonomy. So thank you for being here.

Anagnost: Yes, thank you.