

THE ASPEN INSTITUTE

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AFTERNOON OF CONVERSATION: SATYA NADELLA

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AFTERNOON OF CONVERSATION: SATYA NADELLA

MR. ISAACSON: Welcome, everybody. It's my great privilege to present the CEO of Microsoft, Satya Nadella.

(Applause)

MR. ISAACSON: Satya has been the CEO for 2-1/2 years, but it's been 24 years, I think, since you've been at Microsoft. Twenty-four years is a long time -- 1992. It was not legal for people to go on the Internet as just common citizens. Al Gore hadn't passed the Gore Act which was what got him in trouble when he took credit for inventing the Internet. But it did provide access. Bill Gates hadn't yet written the memo. Now you've taken over a company that's totally dominated by connectivity.

Let me start with the big question we've been talking about at the Ideas Festival so far is that all of that will lead to an artificial intelligence, artificial intelligence will take our jobs, and will have some frightening new future. Do you believe in that scenario?

MR. NADELLA: First of all it's great to be at the Ideas Festival.

(Laughter)

MR. NADELLA: Because you got straight to the point. I mean quite honestly it's such a privilege to have a chance to sort of breathe the air, soak the atmosphere where you're celebrating ideas and to know that you're in safe ground. That means any bad idea of mine will also be at least celebrated for a few minutes. And it's just a privilege to be part of this.

You know, the -- you know, I wrote a piece just yesterday on AI because the thing that -- the way I came at it, Walter, was I've been thinking a lot about as creators of machine intelligence and artificial intelligence. What are the design principles? What's this design sensibility that we do have as we create these applications or platforms? You know, aside from Asimov no

one has actually said here are some design guidelines for software engineers who's creating AI.

And I felt like the real thing today that we need is those guidelines for the creators. And when I thought about that the first thing I said, wow, we have a choice to make, for example. So as creators we can decide how we design them. So I fall in the camp of how do we create AI to augment the human capability, enhance the human experience. So I fall into that camp. So now -- then after that I sort of said let's go take it one click down and say what are some of the things that one needs to do to build into AI so that the "human welfare" is front and center.

That means algorithmically you need to be able to infuse into AI things like trust, you know, basically the ability to have transparency in how it works, to be able to take back control. And then most importantly, how do you even infuse into the AI you create, human values of empathy. So I thought about that and I -- that's what I wrote. But one of the things that I also got to was it -- which kind of gets to the question you asked -- what do humans need to do in a world where AI exists.

We can't sort of say -- deny it. So one of the things which I think would still be scarce even in an AI-rich world would be empathy, curiosity, the ability of humans to be able to explore things which are nonlinear. And it's fine for AI to win a -- you know, a game of goal or -- it's a fantastic achievement -- or to be able to get to high quality speech recognition which we have now, or image recognition.

But it's not the same as being able to do what humans do today when they're at their creative best or they're at their empathetic best. And education -- because what does it mean to give ourselves the skills to be able to in fact ride this AI wave versus be afraid of it.

MR. ISAACSON: But you know, when people say we need the skills to ride the AI wave they say we have to teach engineering, we have to teach coding. I'm hearing

you say we have to teach creativity, we have to teach empathy, we have to teach the things that humanities teach us. Do you think, well, that in the future we should be training our kids to do what machines can't do?

MR. NADELLA: I think that that's one avenue for sure which is in a world where -- let's just take the following. It's in fact one of the used cases I just recently came across was someone who's in airline -- an air engine -- air plane engine mechanic started saying, okay, I want to do my job better or how can I do my job better. One of the things that they're now using is a HoloLens which has the ability to, for example, put holographic output that is superimposed on top of the engine where the expertise of someone who is remote can be brought and now you feel so much more proficient.

So here is someone who's not as skilled as perhaps the engineer back, is in fact able to do more complex operations than ever before. And the fact that connectivity -- the fact that things like image recognition which is fundamental to how these holograms get superimposed on analogue world -- work is in fact giving people more skills and more super powers. So I think you're right, teaching people more diverse set of subjects beyond STEM (phonetic) could in fact become more important.

(Applause)

MR. ISAACSON: Good for us humanists. You said just now about augmenting intelligence rather than just pure artificial intelligence. And you've talked about ways just now that machines can work with people. Do you think that the quest of a company like Microsoft should be creating technology that replaces humans or creating technology that partners with humans?

MR. NADELLA: I for sure am focused on technology that partners with humans. It doesn't mean that some of this technology does not replace some of the human activity that we do today. That's sort of the distinguish -- the distinction. But I do want technology that is fundamentally going to bring out the best in us,

give us that productivity gain, give us the avenues to be more creative, give us to have the impact that we all seek to have in the world. That's definitely what I want us.

Like, for example, one of the things that we're very enthused about is Katana which is something that Yuri talked about which is agents are definitely like the Web. I think it's the third runtime. If you sort of said PC operating system was sort of the beginning of personal computing, then we have the Web. What is the new runtime to me is this runtime around agents -- personal assistants. And the idea of the personal assistant for me is it's not about replacing my administrative assistant actually.

It is in fact giving me my time back where in all this abundance I have of compute power what I don't have is the attention span perhaps, to be able to really love -- live a full life, to be able to enjoy every moment. But if I could have an assistant that in fact knows me, knows my context, knows the world and can help me, that is helping me.

MR. ISAACSON: You just said a moment ago, though, that you'd be creating technology that replaces some of what humans do -- takes over of what some of humans do. The argument that's gone on for 200 years ever since the Luddites were smashing the looms is that technology will create fewer jobs. If technology makes us productive, will there be more jobs or fewer jobs in the future?

MR. NADELLA: Look, there is no question that with every new technology there is massive displacement that we have had to deal with. It is true in the industrial revolution; it's going to be true in this digital age or AI age. And an argument can be made that in the past there was enough time for the person being displaced to in fact retire so that their children could get skilled in something else and find a job, right?

After all we've seen some of the biggest displacement or migration from the agrarian economy to the service economy of the modern United States. And that has

been a generational shift as opposed to happening within a generation. And so therefore I think we might have to deal with this much more than we have dealt with in the past. So then my answer to that or at least my one solution to that is that means we got -- we -- this entire notion that somehow I'll go to school, I'll get educated in a skill, and I'll get a job and that's it, and I'll be in that job -- I think those days are over.

We will have to deal with as a society, as an economy, re-skilling on a constant basis. We see that even in high-tech. When we look at -- for example, one of the biggest things that I'm going to probably push is how do I teach software engineers some of these new techniques to be relevant going forward and --

MR. ISAACSON: What will Microsoft do to help re-skill our society? Will you create products and services in LinkedIn, you know, tie that in for that?

MR. NADELLA: For sure. That is in fact one of the things that I think a lot about. And Yuri touched on this which I was thinking about which is he sort of said there is, what, \$1 trillion of surplus or -- created every 5 years now and the consumer Internet has been an amazing thing in the last 10 years. But you look at the productivity stats and the job growth stats -- they're pretty stagnant. And so the question I've been asking myself is, you know, whether it's maybe the way we measure productivity or what have you.

But nevertheless, how can digital technology in fact lead to more jobs. The question is, is there going to be a dividend of digital technology that is much more evenly spread between professions, between countries. And in that context I start in fact with how do we enable people to be more creative. What tools can we build to be able to learn, but actually apply that learning to create? That is at the fundamental pursuit of LinkedIn.

Because LinkedIn is not just about having your profile and finding a job, but it is about being able to find your economic opportunity and then knowing what

skills you need to acquire in order to find that economic opportunity. And that's definitely the pursuit.

MR. ISAACSON: One of the things we've seen over the past year culminating with the Brexit vote last Thursday is a sense of rebellion against, you know, trade, emigration, but also technology and that it's displacing people who used to get up as you said, get a career, show up at work and be secure. I heard you talking to Governor Romney earlier today just in personal conversation about whether or not this is something that technology is doing or it's something that policy decisions we make can fix. Tell me what you think.

MR. NADELLA: Yeah. I mean here's how I come out at it. Just like the AI topic where I think it's -- there's responsibility we have as technology companies to have a set of design principles that lead us to create AI that is in help of humanity. I think that we also have to have the responsibility first as companies, as businesses, to create economic opportunity. For example, as a multinational company we're -- 55 percent of our revenues are global. I don't think you can participate as -- in all of these countries and not create local economic opportunity.

In fact every country I go to -- I was very recently in Asia, you know, traveled six countries in sort of 9 days. And the first thing that I focus on is what's the economic opportunity locally we have created, whether it's the local startups that are getting leverage from our Cloud, whether it's a small business that's getting more productive, whether the public sector organization locally is able to do things more efficiently because of what we do. It is so important for us to create that surplus locally in order to have a global business.

Because I think if you don't, and all you do is rent collection, that's not a stable way to do business globally. Then I believe the same responsibility also lies in our politicians. Because I think we as America are better off -- and so is every nation, but let's talk about sort of the real beacon of democracy and progress -- that is the United States. We need to be able to make the

case for both addressing the inequities of our society and the responsibility we have in a globalized world. We can't pit one versus the other.

Because if the political discourse is about one versus the other and choose in the United States, then I think that's just got bad ramifications for the rest of the world. So people like me in my company, we've got to know how to be global citizens, and you know, contribute globally. But I also think that the political class in the United States and the political discourse in the United States has to get to a level of sophistication where we are able to deal with both sides of the issues.

Because there's no denying that globalization has not led to dividends that have been spread equally. So those are policy choices, they're policy issues. Let's implement those policies better next time.

MR. ISAACSON: In other words, spread it more equally so that there's not a division.

MR. NADELLA: That's correct.

MR. ISAACSON: You mentioned a moment ago -- and this would be a way to help with the economy in empowering people -- that you should help create a maker's economy. What do you mean by that and how is Microsoft doing that?

MR. NADELLA: Yeah. This is -- you could call it my obsession. I look at it and say, look, you know, I think we are well-served today in terms of how to consume digital technology. I mean there's lots of video to watch, there's a lot of news feeds to sort of flick around. You can even watch others play games. It's fantastic. I mean I have so much I can do with all my free time. But what about turning it around?

What about getting every -- you know, one of the things that this summer is going to happen is Minecraft in education. And I look at what kids are creating. We just recently launched something called Realms which is a shared space for multiple kids to build their spaces and invite each other. And the creativity of that is just

mind-boggling because Minecraft even has a physics engine built into it. It's not just about a virtual world. They're able to even build a computer as a virtual computer in Minecraft.

And I look at that and say, wow, I think human beings are capable at the very core and in fact we want to be at the very core, the right balance between consumption and production. The next wave of innovation I hope, that half a trillion or \$1 trillion that Yuri is going to make next comes from (inaudible) places on companies that are turning all of us into makers, creators, and expressers. And I say that with -- because --

MR. ISAACSON: As opposed to somebody who consumes and downloads a Videostream, people who create and make products empowered by technology.

MR. NADELLA: That's right. And that I, you know -- and I say that because in some level that's who we are. I mean I should sort of express that because Microsoft, if you look at it, we think the best consumer product we ever created was Excel. Because think about it -- people couldn't make sense of numbers before and now everybody can. I mean think about a world without Excel. I mean it's just impossible for me.

(Applause)

MR. NADELLA: But to me that is -- I mean I love games too, but you know, it is that sense of ability to express, create, make, build. After all in fact Bill dropped out of school to create the first product of our company which was the BASIC interpreter. We are a tools company first before a lot of other things we did, and I think the -- and that is what I want the next 10 years of sort of our technology innovation to represent.

MR. ISAACSON: You know, it was the vision that both Bill Gates and Steve Jobs shared, which is a company that will empower people to make things. And that's what you're now trying to return to with that.

MR. NADELLA: Absolutely. I mean that -- that's -- in fact when I joined the company in '92, we used to talk about our mission is a PC in every home on every desk. But to me that weirdly enough, you know, we achieved at least that in the most developed world by end of the decade. And the thing that I've been trying to get back to is what is really the identity or the ethos behind what got us to build the PC.

And that's what about -- that's the empowerment, the notion of empowering every person and every organization on the planet to achieve more. And to me organizations matter, because I think about institutions that human beings build so that it outlasts them as in fact a very important thing in society.

MR. ISAACSON: And with Microsoft you -- your choice of CEO -- to become CEO they finally took a product person. How being a product person did that change you versus being like Steve Ballmer who was a marketing person who would go through many companies that have chosen finance, marketing, whatever? It would turn to the roots to have a product person leading the company, is that right?

MR. NADELLA: Yeah. That is definitely how I think. The thing that I would say, Walter, is the way -- you know, as you described it, I'm a consummate insider. I mean I've grown up at Microsoft. That's pretty much all my professional experience. And the thing that I've tried to do as objectively as one can do being a consummate insider is to try and look at it with a fresh set of eyes and to be able to understand or rekindle what is it that drove success, what is it that drives our passion, and be able to bring that back in what is a very changed technology landscape.

It's not a -- the way I in fact think about it is like mission and sense of purpose is constant and culture needs to be renewed. But technologies are always going to be changing --

MR. ISAACSON: And the biggest change in the technology landscape is what? The Cloud? Big data?

MR. NADELLA: Sure. Yeah, I mean the way I, you know, even described it in the first piece of e-mail I wrote was, it's -- we live in a world where computing is everywhere, it's ubiquitous. And intelligence is going to be ambient. And I sort of later on sort of made it simple for, you know, consumption, called it mobile-first, cloud-first. And what I mean by that is it's the mobility of the human experience. Because you want to be able to go from place to place and be able to have your applications, your data, your experience move with you versus being bound to any one computing device.

In fact, I say the mistake we made was perhaps to think of PC as the hub for all things for all time to come. And I don't think that'll ever be the case. Yeah, there'll be a period of time when one device is a high-volume device. But computing itself is going to become more and more ubiquitous. And the Cloud is the control plane. What enables that mobility is the Cloud. And even Cloud, people sometimes think about it too narrowly. It's not a destination. It's a new form of computing which is going to be truly distributed.

MR. ISAACSON: And it will help sort of create the artificial intelligence in some ways that you've talked about. You said you wanted to have rules of the road, a most moral rules of the road. You've mentioned Asimov. His first rule, if I remember correctly -- you probably remember it -- was that a computer can never do something to harm a human.

MR. NADELLA: A human, yeah. That's right.

MR. ISAACSON: Is that true? Have we --

MR. NADELLA: That's right. I think that --

MR. ISAACSON: Have we violated that already with --

MR. NADELLA: I don't -- I mean that is the choice we get to make. I don't believe so. I mean in fact one of the fundamental examples I used in my piece,

for example, was we have a deep-loading network around computer vision that's being used by this one gentleman in fact who built it who's visually impaired to be able to see the world. In other words, he's interpreting. So this piece of equipment he wears on his eyes interprets the world because it sees the world and translates it into -- for him.

MR. ISAACSON: Do you think a device like that could ever be programmed, I guess is the word, to have empathy?

MR. NADELLA: Here's what I believe. I believe that we as programmers ultimately need to take accountability for even the automated judgments of machines, so see if that makes any sense because after all, we are designing them. We're designing them in ways that they are going to learn themselves, right? Because one of the fundamental things about artificial intelligence is you're not programming them, you're creating these learning systems. And these learning systems learn from data. But yet I think one of the fundamental challenges we have in front of us is hoping to have accountability.

MR. ISAACSON: One of Asimov's rules was that humans could always take back the power from the machines.

MR. NADELLA: That's correct. That's correct.

MR. ISAACSON: What you've described might violate that rule if they can learn and start doing things on their own.

MR. NADELLA: But you should be able to -- in fact one of the things I wrote is one of the new rules that we need to have is humans should be able to address any unintended consequence of, you know, an autonomous decision.

MR. ISAACSON: Do you think that computers that learn that way may also pick up bias? And how do we stop that if so?

MR. NADELLA: And -- that is correct. And so therefore one of the things that we ourselves have learned with our experiment with Tay was it learns, it learns from in fact human discourse. And if the human discourse has bias, you could in fact pick up those as signal. So that means we have to have the responsibility and accountability to design into the system how not to be able to fall into that trap of bias.

MR. ISAACSON: Give me an example.

MR. NADELLA: Which is just like how we teach children. When somebody would pick up a bad language at school when we come back we teach them that no, this is not the way to be -- participate in society.

MR. ISAACSON: If you create as you said you have, facial recognition, will it know race and will it make judgments based on race?

MR. NADELLA: In fact I would say it should not make judgments based on race. It should in fact be able to recognize race, but it's not about passing judgment on race. So that's where I think even the diversity of the team designing the artificial intelligence that is passing the judgment needs to be, you know, in place.

MR. ISAACSON: It's possible that this type of robotics and technology will either increase or decrease inequality in society. Do you think it's the job of people like yourself creating this technology to push towards the side of making it more equitable and promoting equality?

MR. NADELLA: I think we don't have long-term business if we do not address the inequities. That's why I'd go back to what I said which is let's say -- you know, I was in Egypt at the very beginning of the year. We talk about our, you know, emigration issues and what are we doing in the refugee camps and what have you. But the real challenge of emigration is right in the Arab world. And be able to contribute to that challenge by saying, okay, what is the level of education being afforded to

students in refugee camps in each. What could we help and do is a super important thing for us.

Because if we as a company do not take that extra step going beyond our immediate revenues, long-term we're not going to have a business in Egypt or Lebanon, any other country. So I think that that's one of the multi-constituent things, quite frankly, I have come to realize as a CEO, you know, a lot more than even one step removed. But just saying -- being, you know, victims of just short-term capitalism is just not going to be a way to in fact build a long-term business.

MR. ISAACSON: I think we can announce something today which is you finally have gotten a book deal. For those of us who write books that's a big deal. And I think today you're going to announce that you -- I think HarperCollins is doing a book. It's called *Hit Reset* (sic). Tell me -- it's partly about yourself, but it's partly about how all of us have to hit reset, right?

MR. NADELLA: I think it's *Hit Refresh*.

MR. ISAACSON: *Hit Refresh* -- sorry.

(Laughter)

MR. ISAACSON: I need to reset, you need to refresh. Yeah. *Hit Refresh*.

MR. NADELLA: Yeah. I mean in all honesty I've not written it. It's just the book deal. I'm told you do the deal first and then you start writing. I hope that's the way it works.

MR. ISAACSON: Now you're telling me.

MR. NADELLA: It's really more of a book that I hope to write which is meditations of somebody who's a sitting CEO of a company going through a pretty cathartic transformation. It's a moment in time where there is a lot of change -- change with us, there is change in the industry, there is change in the society, and navigating it. Because I felt like one of the things that I think a

lot about it all the time and I felt I want to write about it as I'm going through it.

It's not a memoir. It's definitely not about something that's a finished project. It's very much the trials and tribulations of a person going through transformation, which is the hardest thing.

MR. ISAACSON: Well, let me end with this which is more personal because in some ways going through the transformation you've done. In many ways you've led an incredibly typical American life. You were born in Hyderabad, India. You then went to Bangalore. Then I think you got your electrical engineering master's degree University of Wisconsin. You come here. Tell us what your own personal journey as an immigrant but also somebody who became a great engineer in America, spent 24 years at Microsoft, how that ties in to refreshing Microsoft and even refreshing us as an American society.

MR. NADELLA: You know, it's fascinating. I remember the first computer I got was a Spectrum ZX80 when I was probably in 9th grade, 10th grade. That was the first time I got a computer to play with and it had a BASIC interpreter. And I think about -- I wouldn't be in Microsoft, I wouldn't be in the United States but for Microsoft. And it's pretty ironic in that way in the sense that it's the American ingenuity, innovation that in fact reached, you know, and touched me in growing up in India.

And then the immigration policy of this country that let me come here and then live my life here. And so I feel very blessed on both fronts. That's why I think that this is an amazing country. I am always optimistic and bullish about what the United States and what the United States is capable of doing and what the United States means to the world. But the thing that perhaps that most strikes me having grown up in India is even the brands that I grew up with, many of them multinational, I always could make the difference between companies that were there contributing to the country, to the people of that country and companies that were just collecting.

And I hope that that sensibility is something that I have now being a CEO of a multinational company in a country like the United States which I think has to be not only innovating, but creating economic opportunity everywhere.

MR. ISAACSON: Satya Nadella, thank you for being with us.

MR. NADELLA: Thank you so much. Thank you so much.

(Applause)

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