



Stanford eCorner

The Ethics of Innovation [Entire Talk]

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June 07, 2017

Video URL: <http://ecorner.stanford.edu/videos/5420/The-Ethics-of-Innovation-Entire-Talk>

How often do entrepreneurs and corporate leaders think about issues like fairness, accessibility or unseen biases in the technologies they invent and advance? That's the challenge for companies leading the digital transformation that's disrupting every aspect of society, says Toni Townes-Whitley, Corporate Vice President of Worldwide Public Sector and Industry at Microsoft, in this talk about innovating strategically and responsibly.



Transcript

- Hey, folks, it is phenomenal to be here back on campus. It's 1982, was the last time I was here playing basketball for Princeton Women. We did beat you. Look, we've forgotten it, but for the tee-shirts that we printed, we forgot it, we forgot it. It was a great game, I was playing power forward. So, it's phenomenal to be back a few years later in this role talking on a conversation that I would say is an emerging topic, not only across technology companies, but quite frankly, in the spirit of leadership and what leadership's gonna look like going forward. So, my role, I'm 27 months in at Microsoft. And I made the decision to leave the east coast and come out to Seattle with my husband because of a mission, really a mission statement. You say, "Who actually makes a decision "on a mission statement?" Other than the Jerry Maguire movie that you may have seen, which didn't turn out so well for Jerry initially. We really moved on a mission statement.

And the mission statement was to empower every person and every organization on the planet to achieve more. So, I came out to Microsoft initially to run the Worldwide Public Sector business. That's basically the work that Microsoft does across education, government and health in 191 countries. I then was asked about six months ago to take all of the industries, all the commercial industries to include retail, financial services, media, COMS, manufacturing, and to take that in a new way that we go to market. And so, that's what I get to do. I circumnavigate the globe about three times a year, meeting with government leaders, industry leaders, all about this Microsoft portfolio, but also about issues that are affecting the globe. So, the remit, if you do the quick math on the matrix, six industries that I have primary responsibility for, across 191 countries, across the full portfolio of Microsoft to include our Cloud portfolio, like Azure, our intelligent Cloud, our Dynamics, our Dynamics 365 Cloud capability, which is our CRM business apps, across Microsoft Office and Office 365, if you will. As well as all that we do in Windows 10, our operating system in our devices, to include Minecraft all the way to Xbox. As well as that really cool Surface if any of you have it. I brought mine if we wanna talk after.

So, that's the remit. And it's part of that journey that sort of brought me to this conversation around what constitutes the form of leadership that we need going forward. Which fundamentally was not what I was trained when I was sitting in these seats a few years ago. Just a few, I noticed a few of you started to look at me differently, I don't appreciate that. (audience laughs) I'm quite young, I'm quite young. This new form of leadership is a mindset shift, and I did not have it immediately. This shift in mindset of what it takes to lead in a digital arena is really something that Microsoft's spent a lot of time with. It's really trying to index on what does it look like. We use the words digital all the time. You're gonna hear digital transformation in much of what I talk about.

We hear the words leadership all the time. But when you put the two together, it's not as natural as you might think. And what is this new conversation around leadership in the digital era? And that's really where I wanted to just leave with you, and

particularly those of you who are stepping into this space at the early part of your career. And I wanna leave you with a little bit of a provocative message, as well as a bit of a call to action, that leadership is changing. Not only is the pace of technology changing, and how pervasive it is across work and home, and all things that we wanna do by avocation, hobby, interest. But also this conversation around leadership is changing. And it's changing because of the technology, and quite frankly, sometimes in spite of the technology. So, let me highlight where I'm going with this mindset. The world that some of you will adopt, or inherit, as you walk out of these doors is a different world than many of us had 30-35 years ago, when we came out of doors like this. When you just look at the sheer size of the population, and what stress that will put on resilient, on infrastructure.

When you look at, for example, that smart phones will eclipse land lines. What does that mean for the network and the underpinning of smart phones, and how we talk about privacy for the data on those phones? When you start to look at the fact, how much data will be created, how is it stored, how it is accessed, what does it look like when that much data's being created for every human on the planet, every second of the day? For many of us in my generation, we thought of the jobs we would have. We actually started to map to the jobs we would have in high school and college. We started to talk about our careers. But we do have a phenomena that is here. And whether you call it cobot, which is the collaboration of bot and human. It's some of the new technology and terminology. But this idea of living in a mixed reality world is real, and it's coming and it's here in some places. What does that mean for jobs? What does that mean for displacement of jobs? What does that mean for people in categories that are ripe for displacement? And how are we ensuring that technology has the dividend that we anticipate? I love that last one. More conversations with your bot than with humans.

Some of you, I see the eyes getting wider and wider. Some of you look pleased about that, and that's concerning. (audience laughs) So, I don't know what your family situation is, but if you would prefer the bot family reunion than the actual family reunion, we can talk about that, as well. But fundamentally, this ability to engage with a bot, with this form of technology, this mixed reality, this is part of the new world order. But let me just set up for you that digital leadership is about not just building cool stuff. If you are on campus, the word wouldn't be stuff. I'll just say that. It does have the same starting letter. But we love to build stuff. Microsoft is an innovation, I mean, it's just a harness of innovation.

We love to build innovative products, solutions, platforms. But this digital leadership conversation says there's something beyond building cool stuff. There's something that goes beyond the responsibility of what we build to how we build and implement. There's something about digital responsibility that's part of this equation. And there's also something about inclusion. There's something about who we build it for. So, the what, I came out of the generation of the what. What can we build? What's the design, what's the use case? Let's build, let's build, what's the model? But you're in a generation, quite frankly, and we have to as a globe, as leaders, as entrepreneurs, have to start to define this more broadly, have to define it with responsible digital leadership. Being willing to take on the rule of law, of policy, to take on even your own department of justice if you disagree with their perspective on privacy and privacy of data. The willingness to take on the less sexy stuff of how do you handle cross-border data? How do you handle privacy in the EU? What does it look like? What does AI really look like in terms of equity? How do you handle digital equity? And then inclusion, who's benefiting from all this stuff, this cool stuff were building? That's the conversation that we're calling, and I'm starting to quite frankly index on, this conversation of digital leadership.

And it's not just about how pervasive the technology is. It's about the reach that you have to have. A day in the life has to be able to start with a minister of finance in Botswana, move to the head of Rockwell Automation on a manufacturing plant floor, move to Cleveland Clinic in Abu Dhabi and talk about the future of the healthcare continuum, move quickly to JPMorgan Chase and talk about blockchain technologies, and move very quickly into the CityNext conversation that's happening all around the world, particularly in Singapore and India and different parts of the world. That's what a day in the life of digital leadership looks like. And there is not one skillset, there is a multitude of skillsets that are needed to operate in this space. If you'll advance for a minute, Susan. Each year, I go to the UN General Assembly. Last year, if you remember, the UN General Assembly, some of you may know what happened in 2015. But in 2015, the 193 leaders came together at the UN, and agreed on 17 sustainable development goals that would take our planet to 2030. 17 goals, 17 goals about clean water, about education, about health, about gender equality.

The last time 193 leaders around our globe agreed to anything, I think we should just celebrate that. But we have these 17 sustainable development goals. Every year, I go back to talk about what should companies like Microsoft be doing to drive that conversation? So, last year I was in New York, President Obama at that time had asked all the tech leaders for a call to action for the Syrian refugee crisis. How do we address the refugee crisis? And all of us came to the table very quickly to talk about things that we might do. Our technology from Microsoft, it was Skype translator. How do you translate if you're a refugee that falls into a camp, you don't speak the language there? We talked about how would we do digital literacy? Everybody brought, all of our competitors, we're around the table, wonderful time with President Obama, Vice President Biden, George Clooney, I did have some focus there but his wife was right next to him. (audience laughs) She was really quite bright. And we had a wonderful and deep dialogue about this, but in reality, the conversation that probably shifted my mindset the most, was a

conversation with 150 plus women from refugee camps. And these women sat on a panel and told me what the life in a refugee camp looked like. And that was the call to action they gave me.

Don't teach me to sew in these camps, teach me to code. I wanna be part of the digital transformation. In fact, don't send me another program that takes me backwards, I wanna go forwards. That was what got my attention on how pervasive not only technology, but if you don't have a shift in mindset, you're not even thinking about the reach that's needed with these technologies on who we need to be able to address, how far we need to go. So, when you think about pervasive technology, you think about a more connected globe of 7.4 billion people. You think about some of the challenges you're gonna face. I put forward to you that the construct that I'd love you to take away, if there's two words to take away from these 40 minutes together, is digital leadership. And what does that mean? Fundamentally, that means we're gonna transform. Digital transformation is occurring every industry around the world. I work with large companies down to the CEO of Ring Media, 24-year-old that came up with an idea in Singapore to provide a doctor for every person in a marginalized area.

Eight million patients later, this 24-year-old CEO has created something that is moving faster than almost anything I've seen on this part of the world. So, small companies, a few folks in a garage, a few folks thinking of an idea, to large companies, some of the largest companies in the world, everyone's transforming. Almost every company's becoming a software company. Thyssenkrup, and elevator company, an elevator company. Elevator is a service, really? These guys are all in front of creating something new, something new and bringing their products to market as a service with a utility. You wanna go on the fastest ride on the elevator? There's elevator as a service. Thyssenkrup is using IoT, or the Internet of things, the technology and sensors to find out how to manage elevators in some of the most efficient ways around the world. So, everyone's transforming, but it's not just enough to transform, it's also required to have responsibility, to think about how, not just what, but how we transform. How do we stand on privacy? What principles do we stand as a company, and quite frankly, as a set of companies, as an industry, what do we believe in? What do we stand for as it relates to transparency, or security, or compliance? What do we stand for when we talk about artificial intelligence? How far are we willing to go? How far are we willing to go in bot technology? This is a conversation that we're having. And then finally, inclusion.

It's in that Uber-Venn diagram that I would argue and I would put forward to you that digital leadership is what's needed for everyone on the planet to think about the responsibility of digital leadership. So, let me give you a few kind of examples and definitions here. When I talk about it, I'm not saying this is all Microsoft. You've seen some of these headlines. When you look at the charts, you know that every company is trying to work through this conversation about where are they gonna fall on a digital leadership continuum? Whether it's IBM in this conversation about New Collar jobs. The 1.8 million deficit they see in cyber jobs going forward by 2020. That deficit, they're trying to create more cyber security training for New Collar jobs. It's interesting this quote from the J.Crew CEO, speaking to, I did not realize the disruption in retail that would occur with online retail, how it would compress the cycle from design, design incorporate, if you will, design concept to actual purchase. How that's being condensed with realtime purchase, realtime design. Did not know the disruption that would occur.

When you look at obviously Facebook, and all of the innovation that they are talking about here. What they're trying to do and invest in India, and access 40% of India in world populations that don't have access, not only don't have Wi-Fi access, they don't have access in many ways to the basic elements of the digital economy. Making those kinds of investments. Obviously Apple, all about their supply chain and the renewable, and setting criteria for their supply chain on renewable, the ability to drive renewable energy. And obviously Microsoft. I don't know if you're aware that we are convening a Digital Geneva Convention. Some of you don't remember maybe what the Geneva Convention was, so before I put digital in front of it, maybe I need to ground us there. But literally, we're talking about bringing countries together. What constitutes a cyber crime? What principles do we agree to as a set of countries around how we're going to enforce cyber security? This is a new conversation, an old model, Geneva Convention, old model, but in a new context. This is the conversation that companies are having.

And this is a conversation that requires digital leaders. And each of you has got to start to think about, whether you're in engineering, I came to this conversation through economics, through modeling. Whatever way you get to this conversation, you've got to think about principled ways to consider how you wanna go forward in technology. Because the technology will allow you to go much further than our rule of law, than our policies, than our regulatory environment, even sometimes beyond the human domain. So, with that, let me just give a couple of examples. We talk about digital transformation in Microsoft and Four Pillars, basically four ways. Every customer, and please feel free to check me on this, go on our website, take a look. Every customer that we serve, we talk about digital transformation in four ways. We first start talking about how do you engage your customer? Let's transform how you engage. If you're a hospital, how you engage in your patients.

If you're a university, how you engage in your students. If you're a government, how you engage in citizens. If you're a manufacturer, how you engage in your employees, your plant workers, your technicians. How you're engaging, how do you change the collaborative engagement with your customers, and then with your employees, number two, those employees that work for you, how are you changing that form of engagement? Three, with optimizing this legacy infrastructure that's very, very old and often very, very expensive to maintain, how do you modernize your operation with obviously Cloud and Cloud services,

and data centers that are current, and new capabilities in Hybrid Cloud? And finally, probably the most exciting, how do you transform your business model? How do you go from a company that builds X to providing maybe solutions and services? Maybe you even enter a new market or you create a new revenue stream because you're changing your business model. A few examples of the transformation that we see. It's interesting when you look, business leaders. 80% of them believe that they will be disrupted by digital, and they're not ready. They feel it, they sense it, they're not ready. Certain industries are moving faster than others. You can imagine which industries might be lagging, which types of industries would be lagging.

Health, very tough with the regulatory requirements. Financial services, very tough. Interestingly enough, insurance, stepping out in front. Manufacturing out in front with mixed reality in various forms of technology. But some industries are really struggling. But they know they've got a challenge. And then almost, I think the word there is half, believe that their business model's gonna change. So, if you're just on the B-School side of the engineering and you're learning you're in this engineering program and you wanna ultimately be a businessperson, you wanna own your own business or work for a large company or a small company, the business models that you're learning in school, you've gotta learn how to think about a business model. Don't get yourself wed to any one model, because they're all changing. This is about how do you think about business models.

How do you think with this rationale? A few examples, this is sort of a day in the life. These are all my customers. Whether it's Lowe's. You see what they have there, they have the HoloLens on. That's our mixed reality device. What are we doing? That's for kitchen design. That's so that you can literally use hand signals in a holograph, to manipulate a holograph of what kind of kitchen you wanna design before you purchase it. This is design to purchase. Realtime, at Lowe's, holograph. The signals are incredibly cool.

I just pretend like I'm using them sometimes just to show people. My kids think this is amazing. But when you've got that HoloLens on, it's not just about augmented reality, it's about mixed reality, which means you can see the physical world and the digital world at the same time. It means you can manipulate the holograph. That's what the future looks like, and the future is in fact now at Lowe's. Let's talk about students for a minute. We talk about some of the capabilities we do in education. One of the challenges, I moved to the state of Washington 27 months ago. And Tacoma, which is a city in the southern part of the state, real challenge on high school graduation. In fact, the state pretty challenged on high school graduation rates.

In Tacoma, the high school graduation rate in 2010 was about 55%, just over half graduating. So, they came to Microsoft to say, "Hey, we wanna use some machine learning, "some big data, and some analytics, "some predictive analytics, to see could we predict "what are the conditions that create a child "not graduating from high school? "Let's profile it, let's find it, "let's create the use case, "and then let's test it and let's determine "how we can intervene before that time." So, they started the process using machine learning, using big data, using analytics on our Azure Cloud platform. And over time, pushed graduation rates from 55% to 82%, they are now, 2016 last call was 82%. That's the shift that can happen with just analytics, just knowing when and how to intervene in the school process, in the educational life of these students. You know, 2015, Nepal had a huge, huge earthquake. Probably one that pulled every resource out of the UN Development Program. Huge earthquake that hit. Interestingly enough, the UN reached to Microsoft and said, "Hey, we need help." And we started building apps immediately with partners on the ground. Do you know what the apps allowed people to do? These don't sound interesting probably in this context, but I want you to know that two days after the quake, we had victims of the quake using applications on debris management, categorizing the debris. They were paid through this app.

They were given ways to sustain themselves and to rebuild their community. Two days after the quake, we had apps on the ground moving. This is the role of technology in real life, my world has fallen apart, 6,000 people dead, all of the massive, massive loss of life and infrastructure. 48 hours, people went from being victims to working on the solution and the recovery. And then one of my favorites, Ecolab. I don't know if you all have heard of Ecolab. Yeah, we got some nods. What a great company. Really, Ecolab's business model was around tools and products that they built to manage water. Really, they're a water management company.

But they came to Microsoft and said, "Hey, we wanna be more disruptive in our market. "We think that we can disrupt because there's a lot "of data that we can collect "with sensors in all of the water. "And we know there's a water crisis, "a water crisis in the world that's growing, "not just for drinking water, but water "for underpinning manufacturing and other operations." So, we talk about the grid, the electric grid, the energy grid, what about the water grid? And so, they started coming to us and they started to use our machine learning algorithms, and they created this risk equation and this risk tool for water. And now, they're creating water as a service. Helping countries and companies understand their water crisis and starting to intervene earlier on how they're gonna manage it, as well as bring down the use of water. Which they've been able to do. San Antonio's one of the best examples, where they've brought down the use of water, potable water, so significantly by using just data, how to intervene, when to intervene. That's the kind of work that I have the opportunity to do, Microsoft has the opportunity to do, and quite frankly, you have the opportunity to do with these types of customers. That's transformation, it's exciting, and this is our day to day, and boy, we love it. But boy, we also spend a lot of time on our principles.

This is really important to join a principled company, or to be a principled company. You've gotta have your principles in

place before the disaster hits, by the way. You've gotta set principles before the challenge comes. If you're starting to look for principles after a challenge, you're a little bit late. You have to set your principles on what kind of company you wanna be, and then you've gotta implement them when the challenge comes. So, we've got principles around privacy, and security, and transparency, showing our government customers their data in government transparency centers, cyber security centers around the world. I just launched two last year in Singapore and in Brasilia. This is about who we stand for and what we stand for. Protecting human rights, ensuring sustainability, and ethics in AI. So, why is that important? It's important because what may not be in the news all the time is a few companies get the call every time there's a cyber attack.

We get the call wherever the attack is, whether it be France, Belgium, the UK, the US, we get the call. And we start pulling the information that we have from a digital crime unit that we run, that just tracks botnet activity around the world. We don't do this for a charge. We do this free of charge. We do this and we feed this information to Interpol, we feed it to the US, we feed information on what's occurring in the cyber space. And this is the kind of challenge that we have to try to address. But not just cyber, beyond cyber. This AI conversation's been so amazing. We've been leading at AI, but as you lean into AI, you better have a point of view on privacy. You better have a point of view on the trade-offs.

You better have a point of view on things like algorithmic bias. Anybody heard of algorithmic bias? What happens when your facial recognition doesn't recognize faces of people who are brown or have different facial features? People that look like me. What happens? Because we say coding is neutral. Well, coding is not done by neutral agents. People code, and are people neutral? Not always. It doesn't even mean malicious, it just simply means not aware. And so, some of the new work that's come on algorithmic bias. I love the work from Joy, and I never get her name correct. Buolamwini, I think, just recently did some work on the coded gaze, right, some of you are nodding. Work that she's found on the bias, racial bias in algorithmic coding.

GDPR, a new privacy standard for Europe is coming. A privacy standard that says that you, that every European has the right to understand how their data is used in an algorithm. They have the right to be forgotten. They have the right to audit. These are changing the way we start to build applications and how we deal with privacy and data. Because if you're gonna step into AI and you're gonna lead in AI, you better know what the end looks like. And the end looks like a conversation about how far are we going to go, and what are we gonna protect along the way? That's why we're involved in some of these conversations. I just came from Hannover Messe. Hannover Messe's one of the largest manufacturing events in the world. And I was there with a number of Microsoft partners.

And this was the conversation that was all over Hannover in Germany. All over, humans and machines. We probably had nine or 10 partners in production using artificial intelligence and bot technology, using HoloLens and mixed reality in the way that engineers and service technicians were actually doing work. And so, the conversation was on human and machine. And it was on digital twins. If you haven't done the research on digital twins, I would invite you take a look. Digital twin is the holographic twin of everything that's created in the physical world that we create in the digital world, so that we can manipulate, and train, and work in the digital world before we have all of the consequences and implications of the physical world. There's some wonderful applications, wonderful. Think about medical training, training a surgeon, where you can take a holograph, and train, and pull out the circulatory system, and the nervous system, and literally manipulate a holograph to train. Think about population health, remote telehealth, where we can take things to remote areas.

Think about a jet engine, like Rolls-Royce, that would fill up this entire room. We couldn't move it here, but I could bring a holograph here, and we could operate that jet engine right here, and I could teach you how to train it, how to maintain it, right here in this room with the HoloLens. That's the future and the current, but it also concerns a lot of people. Where are the jobs going? Who's being affected by this? Inclusion. This is really about, and probably if I'm the last speaker of this series, and clearly we have saved the best for last. I wanna thank you for that. That's how I'm receiving your feedback, I am. But probably let me save the best for last here. All of this matters when a digital transformation, or a digital economy, is accessible and democratized for everyone. And so, there is a very real chance that if we're not purposeful about this conversation, that all the investments in digital transformation won't have the outcome that we're looking for.

So, we spend a lot of time on programs. Yes, Microsoft and our competitors do this. This is not an infomercial for Microsoft. This is a conversation that I wanna have with you about how you design and build in the new world. Because if you're not careful, you might end up with something you don't anticipate. If you flip to the next slide. Here's the study that was done by the World Economic Forum. And the study basically shows that by 2020, for every one digital job that is created for a man, four traditional jobs will be displaced. That may be concerning to you. That's a one to four ratio, fair to get kind of sit up in your seat.

But I'd like you to sit up a little farther in your seat, because for every one job created for a women, 20 jobs will be displaced. Now, why is that? Now, you get to put on the economics hat for a minute. Women around the world are disproportionately in labor categories that are ripe for digital transformation. So, when you're disproportionally in a labor category that will be transformed, the impact of that transformation is gonna be more severe. So, what does that say to a company like Microsoft? If we're not intentional about programs for entrepreneurial activity, digital literacy, and getting more

women through STEM, which by the way is going in the wrong direction right now in this country, doing better outside of this country. If we're not intentional about that as a company, we'll have a digitally transformed workforce. We're gonna have a few people that are amazingly digitally literate, highly, highly agile, but the gap and the divide is gonna be worse than it is today. So, this is why companies have to be thoughtful, and intentional, and purposeful, because the data says if left to our own devices, we'll just keep creating, and we'll still build really cool stuff. Stuff is a code word. We'll build cool stuff, but we will divide the world even more than it is today.

So, this is about a mindset. You all might know that lady, Carol Dweck. I think she's here or has been here. She's been helping us at Microsoft about our mindset. She's done work on a growth mindset. So, we're all learning how to be really excited about learning more versus knowing more. Those are simple words but they're actually pretty profound at a company like Microsoft. Learning more versus knowing more. It's not what you know, it's how you learn. I came up from a generation that it was what you knew.

We differentiated by what we knew. Now, it's not about that. What you know, as interesting as it is, it's more about can you find what you need to know, and do you know your own mindset to know how you learn? So, this is mindset. It's not about a few pointers, it's about a fundamental shift. A fundamental shift in mindset. It's about three domains of knowledge, what you know, what you don't know, and I would argue where we all need to be, what you don't know that you don't know. That's where we're living. We're not sure as we build things where we're going with some of this. That's why you have to have principles and values up front, and you gotta test, and test, and test your own bias. Test and test.

I wanna kind of wrap with how I got here, 'cause it sounds pretty heady and professorial to put all this on slides, and say, "Hey, here's where we are. Here's where we're going forward." But probably 100 years ago, I was sittin' in a chair like you, and when I left Princeton, I decided to go to Peace Corps. And I decided to go, I thought because of my foreign language capability, because I spoke French, I thought I'd just choose my country. That's not quite how the Peace Corps works. I thought I'd choose my village, not quite how the Peace Corps works. So, when I got to Gabon in Central Africa, he says, "Hey, the people with the highest FSI score, "or foreign language score, we're gonna send you "the farthest away, 'cause you'll be fine." So, as I say goodbye to all my colleagues and friends, I kept going. And I kept saying, "Are we there yet?" No, not so much. So, I flew to Franceville and then I took a bush taxi up the coast, almost on the plateau of the Congo. And finally, I arrived. I arrived at Ngouoni, my village.

As an African-American, I was wearing African garb so that I could greet, I was thinking I was gonna have a real reunion experience. I was ready. My friends, my family, I am home. I am here, I'm so excited. And I heard the children singing (speaks in foreign language). And I thought, oh, they're welcoming back our sister, our black sister has arrived back. It took about an hour for me to realize that (speaks in foreign language) means white person. I was confused. I kept showing them that I am here, I am back. Why did it mean white person? Why did they call me (speaks in foreign language)? Because I came in a Toyota Land Cruiser.

And it wasn't about color, it was about socioeconomic capability. If you come in a truck, you're white. If you don't, if you walk in without shoes, you're black. Imagine my first cross-cultural moment, how well I did in this village. But I stayed and I persevered and I taught six classes. And I played soccer, the first woman to play soccer in that village, and the first person to start a strike, and I did a teacher strike. Because I found that some of my female students were being assaulted by the gendarmes. So, I brought all kinds of things to the village. One of the ideas that I had was we were gonna catch rainwater, because the rainy season in Gabon is like no other rainy season, I'd heard. And you know what? Every day we walked to water.

And I had so many villages that I would visit, and we always walked about three kilometers to get water. And women carried heavy, heavy, heavy potable water. And I thought, "I can fix this, I can fix this." Take the rainwater, I'll go get some money from the US Embassy, which they gave me, another mistake. They gave me money and they said, "Hey, if you do a Women in Development project, "you're ready to go." I started a Women in Development project, got all the women together in the village. Did I mention that Gabon is a polygamist country, up to four wives legally. So, I took all the middle wives that seemed a little bit irritant, they just seemed pissed most of the time, the second and third wife. So, I said, "Let me get all the second and third wives." The first wives looked pretty happy, the fourth wives didn't seem to care, they're pretty young and cute. But the second and third wives, I needed to work with. So, I got all the wives together and I started this water project. We're gonna capture rain water.

We're gonna capture it a French bido and I'm gonna put a filter on it. We're gonna save the kids that died in my village from dysentery and all forms of diarrhea. We're gonna do this, and I started this project. And I knew I was, I mean, I was 23-years-old, I had a Princeton education. I know it's not quite Stanford, but I was there. I was there, I'm makin' a difference. I'm writin' notes home, I'm like, this is it. In the course of about six months, I also introduced divorce to my village. I introduced a level of chaos that is unimaginable. At 23, I had created a village that didn't get together in the middle of the village anymore and have festivals and have big bonfires.

No, everybody stayed at their home. I had created New York City. (audience laughs) I was in the Bronx. And so, here I am at 23, none of the elders spoke to me. The women took the tools and traded them in for money that was more than their husbands could earn in a year. I mean, I had totally disrupted. Here's the lesson here. I had to go back and apologize to every elder. I had to go back and learn that the walk to water that I was fixing, is not about are your legs strong enough to go get water? That was a time of the day where Gabonese women would take the next generation and wrap them on their back, or walk with them in the hand, and it was woman time, it was girl time. And I was tryin' to kill that so I could get the efficiency of water.

I did not realize what that walk meant. So, if you go to Gabon to my village in Nguouoni, go to Franceville, take the bush taxi two hours up, and you get to Nguouoni, are the water stations still there? Yes, they are. And older women use them. And when you have a new baby they use them. But you know what? They still walk for water. They still walk for water, 'cause the walk was not about the walk, the walk was about community. That's the lesson that I remind myself that we all bring a bias. And technology will allow you to do so many things, but don't ever forget that when you're using the technology, it's not just the end, it's a means to an end. The end is still people, and culture, and fabric, and principles, and values. And we've got to use the technology to protect values.

Those are timeless, those are what you think about in your last moments on this earth, not how cool your device was. That was my lesson. I just wanna leave it with you that digital leadership is what we're looking at as the new form of leadership going forward. It is more than the transformation with cool devices and cool technology. It is responsibly deploying that technology, being aware of how it's being consumed. And it's also about being inclusive to ensure that the digital dividend is, in fact, accessible to all. Thank you very much. (applauding) I believe we have some time for Q&A I think we have some Q&A in the room, and maybe a few folks. Yes, do we have mics? Or do we need mics? We don't need mics, even better.

Okay, yes, sir, I'm gonna start with you. - [Audience Member] Thank you so much for coming. - Thank you. - [Audience Member] So, you talked about having principles when doing business in all these sorts of regions. And so, there's a few things that pop into my mind like blockchain and privacy. And when you're dealing in a few of this, obviously a lot of division on the subject. And when you're dealing with JPMorgan or something, there's probably a lot of division concerning blockchain and cryptocurrency. So, how do you avoid sort of picking favors or do you walk around just sort of having a one-size-fits-all principle when you're dealing with these sorts of issues? - It's a great question. So, the question is around how do you then balance the various constituencies, whether it's a JPMorgan Chase and blockchain down to EU and privacy in model clauses and where we're going. There's probably I would say, I would answer it in two ways.

First, the principles around that Microsoft just put in place have really been there for a number of years. And principles around he who owns the data, the privacy of our end users, that they own their data. They are the only ones that can distinguish where that data should locate. Our ability to be able to locate that data for them, make sure that we can access and show them where their data is, as well as their ability to define how that data is used. That's one of the core principles. Another would be transparency. These are overarching principles. How transparent are we gonna be with our source code? The fact that we open up our source code to every government in the world and show them exactly what we're doing if we're working in that country, that they have that full transparency. Those are privacy and transparency principles that I would say eclipse almost any organization. But you do bring up a conversation that we have even more, which is global and local maxima.

There's a global maxima of things that happen where, if you will, the return is much larger on a global maxima. Where are you gonna put your resources for a global maxima? Where are you gonna put your investments of data centers? People ask me, I say, "Where are you putting your data centers?" Where do we put our infrastructure? You can look and do big math, I would call it, and say at the macro there are a few regions that you have to be in, it's a global maxima. There are still a local maxima. How do you build a developer community in an emerging market? You can't sell to an emerging market unless you build an emerging market first. So, these are the sort of trade-offs that we are making. And I will tell you that the track record that we've had has been really strong on certifications, if you know the Microsoft history. Certifications and compliance, privacy standards and principles, transparency is huge for us. But I will tell you on AI, we're really starting to define what we call the sort of cobot living. This is collaboration between bot and human. What is that going to look like going forward? And how do we ensure that that's complementary? It is not a replacement approach, but a complementary approach.

That's where we're spending our time on new kinds of use cases. So, the global and local maxima are the new terms that most companies are trying to figure out. What can we do at a global level, but what then still needs to be done at local, and where do we make trade-offs. But I will say to you, privacy, transparency, security and compliance, all of you should push every company that's the size of Microsoft to actually codify for you what their stand is. And that's what we're gonna start to do in the Digital Geneva Convention. So, great question, great point. Yes, ma'am. - [Audience Member] Yes, I have a question and it's probably two-pronged. One is that computers in general use an extraordinary amount of energy. So, when we talk about everything going digital on everything going digital, well, energy, how much and where is it coming from is the first truth.

That's one question. Secondly, and related to that, is the other thing when we have this old computers, they're dead and no

longer work, or smart phones, they no longer work and gets junked, they get shipped to countries like India, where people are using, sorting and separating, and there have been cases of actually permanent health problems in those places. Even babies are being born sort of with severe disabilities. So, there is also that downside. And so what is with this digital responsibility, what is that attitude? One is the usage of energy, the other is the poor, underdeveloped countries, and it isn't just India, it could be any other country where they're poor, they live in slums, and you see babies with deformed heads. Or even adults with health problems, with cancer and so on. Because they're doing all the work that no one does here. - No, it's a great point. So, one of the things that we're doin' on the energy side is, and technology can even help us identify what the sustainable algorithms are. So, we're using machine learning to understand where the data centers that are driving the most energy usage, where they are around the world.

Not just for Microsoft data centers, any data centers around the world. We do this with our customers. We use learning and data to understand where we get the highest efficiency, so that we can load balance across for the highest efficiency and the lowest impact on the environment. And so, remember technology has this sort of two-edged, two-headed sort of coin. The very technology that we're using, the power behind that for a data center can hurt the climate, can hurt the environment. At the same time, that same technology can be used to tell us where to focus our capabilities. So, almost all that you should ask each time, and whether it's my company or any other company, is what are we doing in the balance? What have you learned on where in the world we should put data centers and what we can drive, and then are you holding yourselves accountable for the usage and the power that's coming out? What's your green plan, if you will, for your data centers and for all technology usage? We are also a supply chain company ourselves. We build things, we have about 13 plants around the world. We use probably the most sophisticated data algorithms to know which plants are emitting the least, if you will, impact on the environment and the drive and then load balance there? Now, to your point about emerging markets, one of the challenges, and it's great that you brought that up, because one of the pieces that the Digital Geneva Convention that we're bringing to the table is this conversation about emerging markets, and if you will, almost this supply chain that has landed in emerging markets of old technology, whether it be old hardware, old infrastructure, and it's all coming to emerging markets. What's the implication on health, on population health, and mostly in rural India, quite frankly, where it's moving even farther out from the cities into the rural areas.

That's where we need all of not only the technology companies to come together, but countries to come together on what's our, if you will, Digital Geneva Convention? That's actually one of the pillars of the Geneva Convention that we're starting to bring together is how are we gonna handle the waste, if you will, of technology, of hardware? And where does it go and what are the responsibilities if you are dropping that type of hardware, what's your responsibility and liability as a company and as a country? So, that's what we're looking to start to talk about. This is where we need to have a forum that's much broader than just Microsoft to have the conversation. But it's a great point, it's a great point. - [Audience Member] I have a quick philosophical question maybe on the cobot economy. - Yes, sir. - [Audience Member] As we move more and more towards a cobot economy, an estimated 206 billion California businessmen who are basically customers for companies like Apple, and Samsung, and the Microsoft. But if we fast forward that digitalization on that generation or a few years of that generation forward, it seems like that's really declining. And so, the customers of Apple, and Samsung, and maybe Microsoft might actually have to decline to sustain. What's your view on that? - So, the question was around, it looks like there's too many, if we continue this sort of cellphone proliferation and the population on the planet, is our customer base gonna decline over time in the IT spaces as a result? - [Audience Member] Especially once you get to that-- - Fully digital. - [Audience Member] Fully digital economy.

- You know, to be honest, when we look forward, I know there was a recent Harvard study about, even in manufacturing, as we've been talking about all the plant jobs going away, where will technicians go with robot and cobot capability? And it talked about two million new types of jobs by 2020. So, what we find is that the type of job is changing, not that there won't be a job A, but the type of job and the interaction with the technology is a skillset that we're gonna need. So, we're not as concerned in the IT sphere about not having opportunity looking forward. We do think that the engagement and the orchestration is gonna change how people engage with technology. In fact, if you look at Microsoft all up, when we started about 42 years ago, and we were in the sort of the PC market, we sort of defined our market fairly narrowly. We then went to the data center market, we defined it fairly narrowly. Now, when we look at the market, we look at the total addressable market, and it's not just the IT spend, it's the entire company or organization spend. Because everything, technology has pervaded everything. So, from a business perspective, our total addressable market is actually going up. It's going up because we've defined over the last few years only in IT departments and data centers.

When I talked about the Thyssenkrup example, that's not the IT department, that's the fundamental COGS, or the cost of goods sold for the business is changing. They're now in a completely different business model. That's the opportunity for not just Microsoft, but companies like Microsoft. We actually see that opportunity going up. So, when you think of digital transformation sort of at its next peak, if you will, a few things we think will happen. We're all watching the cities, right? Number one issue by 2050, 70% of the population being in urban areas. That migration is one we are all over right now in terms of what's the new city, what's the digital city? What's that gonna look like? What opportunities are there? So, there's a big focus

on urban. We're also doing a lot more in the US now on rural areas. How do we transform old competencies to new? In Pennsylvania, we're working with coal miners, teaching them to code, as an example. How do you teach coding to a different skillset, a different role transforming into the new.

So, there's a literacy piece on digital. There's a transformation of the industries itself, and then there's this larger market that we're looking at as companies are starting to become all sort of software companies in their own right. So, we're not actually that concerned about the future, even quite frankly, our customer base going down. We just have a different set of customers. And our customers now who I'm talking to, chief marketing officers, I'm talking to business decision makers, I'm no longer talking to the CIO. I have those conversations, but those aren't the conversations that Microsoft is engaging in as much as we used to. We're really now going to the core mission critical parts of companies and organizations. And I think we see a larger market, not a smaller market as a result. Yes, all the way in the back there, then I'll come over. I'm sorry, you've had your hand up.

Right here and then here. - [Audience Member] I've got a question kind of related to that, and what I claim is that is a little bit of difference between literacy and education. And you could learn how to speak, but it's a different thing to learn to know who to vote for, or to learn how to understand philosophy or something. It's the same way to digital world players, you could have digitally literate people, but not necessarily have digitally educated people. So, you could learn how to use a smart phone, but not necessarily learn how to code it. Or learn how to use social media, but not necessarily learn how to use social media marketing, two very different things. My question was, in my experience, like I grew up in the Philippines as a child and my experience there was that there's a really high level of digital illiteracy among the Philippino population, and very, very low digital education, or even interest for digital education. So, there's no push for people to code, there's no major push, I mean, for people to learn how to code or learn how to be educated in the digital sites. What are ways that you can foster that need for digital education in a market that's either uninterested or even unaware of the importance of digital education? - That's a great question about the difference between digital literacy, digital education, how immersive digital education needs to be versus just the knowledge of devices and various pieces and what's Microsoft or other companies doing in that space? First, I mentioned digital literacy as one aspect of what Microsoft and other companies are focused on. But let me come back and go back to my core.

Of the six industries I mentioned, one of them is education. If you look at the two largest acquisitions that Microsoft has done, Minecraft, LinkedIn. You might start to connect those in your head at some point, that we are all in on education. So, it's not just digital education, this is about changing the pedagogy, the way education occurs, what we call success. So, we actually when we go to digital responsibilities, one of the things we spend time on are the Ps of standards for education. Learning in on what are the new definitions of what competency needs to be around the world. Moving from language arts and math to computational learning, critical thinking, analytical design. Driving a new way of teaching around the world. We've created a new data science curriculum, one of the first of its kind, because higher ed, what is the number one job skill that I'm looking for to hire when I come to schools like this, I need some more data scientists. How do I create more data scientists? Does it come out of a comp side program, does it come out of an engineering program, could it come out of an economics program, a stats program? I need more data scientists.

So, if you think about at K-12, the investments that we're making are all around the teacher first, the student, in this country we've thrown devices at schools for a decade. And it has not changed the educational outcome significantly. So, here's what we do know. We know that it's not just about cool devices in schools. This is about educators that know how to work in mixed reality. I say this as a former teacher. What we can do now is use realtime data in the classroom to engage with students around the world, and including the Philippines, because we have a team there, around the world on how to train educators to educate with realtime data, teaching code. We've got 1st, 2nd, 3rd graders coding at very, very young ages, because the educator is comfortable, the educator understands. We also have a school leader program. Guess what happens? Once you get educators, you gotta get school leaders.

You have to have school administrators that are willing to make the investments in digital education. So, we have something called Microsoft Innovative Educators. It's certification that we certify teachers around the world on how to teach in this new world order. And our goal is to get to every teacher certification program around the world so that teachers come out of school ready to teach with this. We don't want it to be digital education, this is education for a digital world. So, we want this to be pervasive and embedded in education. And so, I literally just left one of these conferences that we are driving this with everyone who's building capability. Make sure, a lot of these schools don't have a CIO, they don't have teachers that are paid in a way that they're gonna go get trained on all forms of technology. We've gotta make this easy, accessible, available, and really straightforward. So, on that point, education's probably our single largest industry and effort in Microsoft.

Digital literacy is one element, but let's not forget the foundational piece, which is we gotta change the way education occurs in this country and around the world. It's a great question. Ma'am, I'm sorry, you had your hand up forever, I apologize. - [Audience Member] It's directly related to that, and younger children right now, as early as infants, they're digital amoebas. So,

this Microsoft or digital leaders make you also learn as early as that fundamental. Because kids right now, that's basically, that's their instant nanny. - Yes. - [Audience Member] It's not going around. So, the question is how far even early, early ed and even pre-K, I would argue. - [Audience Member] It's probably based right here.

- The socialization, how children feel that they're digital natives, that they come, you know, if I look at my granddaughters try to move the refrigerator door, because they think it's supposed to move like they're startin' to doin' this. Are you cleaning, what are you doin'? They're waiting for things to move, the hard book is supposed to move and do something to talk to them. So, what we've done, if you look at Minecraft, just Minecraft, how pervasive Minecraft is for that audience, all the way pre-K through 3rd grade, all over Minecraft. And it's not just the Minecraft games, it's a way of thinking, it's the way that they structure their thoughts even as an early, early pre-K. And so, we see that, we see the ability to code with kids. Even storytelling, the gift of storytelling. There's a sequence in storytelling that leads so beautifully into the ability to program. And we start very early with storytelling. Storytelling and component size, if you will, messages within your story. And so, we tend to focus on right about four or five, pre-K all the way through higher ed.

That's pretty much our market. But I would suggest to you that all that we're doing on the consumer side with Minecraft, all that we're doing sort of for families to understand, and trying to, quite frankly, broaden that so Minecraft has a menu that goes beyond, we know that they're are boys that like certain things, girls, families that wanna engage together. So, I think you're onto something in terms of probably even earlier in the life spectrum, we probably need to go earlier, but our focus is really pre-K, four or five, all the way through higher ed. And you're absolutely right. We find that Minecraft, and then let's think LinkedIn. What an interesting acquisition. The data on LinkedIn, unbelievable. So, we're thinking about, well, how do we career path? How do we tell every country in the world what their labor market looks like? How do we take a LinkedIn capability and affect this jobs concern? This sort of re-skilling, what we call middle skills, where you start re-skilling people who are 25 to 65. Remember, when we talk education, traditionally we talk K through 12 and higher ed. But the single, largest group of folks graduating right now, even in the US are over 25.

And that 25 to 65 is called re-skilling. Re-skilling people from one skillset into the digital economy, and that's where we think capabilities like LinkedIn are really gonna help us coming forward on how to do that, how to connect people to the right opportunity. I have no idea where I am on time, I'm looking. Okay, how are we doing? There are still a few hands, but you tell me what to do. - [Man In Red Shirt] Nope, we're done, all right. - Not one more, okay, thank you. - Sorry, about that. Let's give Toni a big, warm welcome. - Thank you very much. (applauding)