

**DAVID SOLOMON:** Welcome to Talks at GS. I'm happy to be joined today by Arvind Krishna. Arvind became the CEO of IBM in April of this year. He's been at the company since 1990, leading and expanding IBM into new markets from AI to the Cloud. Arvind, thank you for being here and joining us today.

**ARVIND KRISHNA:** David, a pleasure to be here. And a pleasure to be speaking to your audience here today.

**DAVID SOLOMON:** Well, thank you so much. I always like to start by going back to the beginning. When did you know or first discover that you wanted to pursue a career in technology? And what drove you in that direction as you were growing up?

**ARVIND KRISHNA:** Likely somewhere in high school. I think it was probably somewhere around grade ten or 11 I'll say that I discovered the beauty in physics and mathematics. And I knew that I wanted to use those to apply towards making the world a better place. And that is what kind of drove me to say let's go to engineering school. Loved it so much. And I think maybe this was circa 1982/83, I discovered that communication, digital communication, networking, I was convinced back then it was going to be the wave of the future. And I'd say the rest is history after that.

**DAVID SOLOMON:** It's a lot of history because it was a big journey from there and that discovery to becoming the CEO of IBM. I know I remember the moment when I found out that I would be in my job as CEO of Goldman Sachs. What was that moment like for you when you found out you would be the next CEO of IBM?

**ARVIND KRISHNA:** Oh, I'll never forget that David. I mean, like, you're right. So, I remember being called into the boardroom and the board all sitting around the table. And you're wondering, okay, what exactly are they going to say? What decision are they going to make?

First when they tell you it's sheer exhilaration. That, "Oh my God, I'm going to get the opportunity to lead this iconic company." Coupled with that, later that night comes the, "Oh, I've actually got to do this." I have to help lead us into the future and try to build on the shoulders of what everyone before me has done. And I've got to live up to this. So you get both parts.

And I think that's good. You should feel nervous about doing something that is so iconic.

**DAVID SOLOMON:** Well, it's amazing how familiar that sounds to me. But one of the differences for you is you began your tenure in the midst of a global health crisis, which is kind of unimaginable to start in the middle of this. If there's one takeaway you have that because of the pandemic something that's really going to change when we come out of this or is going to really evolve, what's the number one thing that you think we should all be thinking about where there's going to be a big pivot, a big evolution as we come out of this and get to the other side?

**ARVIND KRISHNA:** I think that all of our companies are embarked on digital journeys. But when I use the word digital and digitization, look, we've all use computing for 55 years. So, it's not just computing and just bits. It's about can we begin to look at how do we make every interaction far more digital and far less always having manual intervention? Believe me, people are important. People bring the creativity, the knowledge, the experience, the interaction. But hopefully like the two of us are doing on stage for your audience, so it's not that humans become less important. But I do fundamentally believe that a lot of the interactions that we have that are of a mundane nature are going to get digitized.

What would have taken five to ten years, I believe is going to take two. So, how do you embrace what digitization does to reimagine your enterprise to really cut through the silos, the processes we all know and love, and to think about much more end to end, leveraging the power of digitization? Whether we use the technologies of cloud and artificial intelligence and blockchain, those are all enabling technologies. But it's really about digitization as a cross-cutting theme. But think about it as a transformation of your applications and businesses processes to go much more end to end, is what I believe is going to fundamentally change in this time.

**DAVID SOLOMON:** Let's shift a little bit on the future of AI and the cloud, which I know is a topic that you spend a lot of time thinking about. And I want to think broadly about the technological landscape. And a letter that you sent to employees on your first day as CEO, you wrote, "Hybrid cloud and AI are two dominant forces driving change for our clients and must have the maniacal focus of the entire company." In October you made a major announcement on how you intend to drive that change, spinning off your technology services business to focus on the hybrid cloud and AI. Why do you see that as so crucial for IBM's

future?

**ARVIND KRISHNA:** Our industry in information in technology is driven by these, I call them, tectonic changes that come around. We can debate it's once every 15 years, once every 20 years. But they come. Circa 1964, and I'll tell you why I picked that date, because that was the advent of the mainframe and of centralized computing. I would say that drove us as an industry for about 20 years.

Then you got a pendulum swinging the other way. And I would put, whatever you call it, networking with the internet coming and client server because that was, perhaps, the media word. But they built on each other. And that kind of drove the next 25 years.

We are now at the beginning of the cloud journey. You could call this the third wave. By the way, these are additives. Not one of these replaced the prior, but they're additive. The other thing that is upon us is massive amounts of data. More data than we all know what to do with. We can debate, do we use 5 percent of it, 10 percent of it? Maybe 20 if we're lucky. The only technology we know that can harness the insight from all that data is artificial intelligence. So those are the two tectonic forces.

And why do I say we must be maniacally focused? Normally within ten years you get full adoption of a technology. Example: 2007 was year one of the smartphone. I think by 2017 we can say safely everybody in the western world who's going to use one, has one. I get it. There's a few people out there who don't. My people is in this audience there's none. But there are a few. We get to full saturation within ten years. Right? That's one great example.

So we are 14 years into the cloud journey. But we are only 20 percent in. Okay, maybe some will debate 25 percent in. Why only 25 when we all agree it is going to be the wave of the future? Because what was easy to move was moved. But now you've got to worry about how do you move hard things whether it's physics, that's latency, or it's regulation which could be law, or it's economics which could be there is no economics to move an application from a data center. So, whether you call it using multiple public clouds, whether you call it using a private cloud for some application, how do you knit all that together? Because today everybody says if you only go to one public cloud, we have the answer. But that's unlikely to be the enterprise

answer. So, that's why I call it hybrid cloud. And I'd say that's the destination. It's not a way stop. Because I think everyone will use multiple providers [PH]. You will use multiple [UNINTEL] service providers. And we can think of them, I'll mention areas, not names, we can think of CRM or HR or marketing. And we all know who many of those providers are. Coupled with multiple public cloud providers. Coupled with, likely, some amount of private cloud. That's the destination.

How do you work there? And that is why I call it a maniacal focus, both on technology platforms and in our case, also, the expertise to help our clients go on that journey.

Then artificial intelligence, if we thought 20 percent sounds slow, the estimates are that AI will unlock \$16 trillion worth of productivity. That's not the technology market or some of your investment bankers sitting out there. But it's the productivity for the world at large. We are, like, three, four, five percent of the way into that journey. So, again, the amount that's to be unlocked really excites me because then AI is going to infuse everything. AI is going to become a little bit like electricity was probably 80 - 90 years ago when the world went through a wave of electrification and all the other power sources of belts and water all went by the wayside. AI will begin to infuse every single business process. And as it does that's a massive opportunity for all of us. And I say all, not just us technology providers, but also those of you, because you're really also a technology company, partly, and you bring that to your clients but in service of financial services. And then there are others who consume those also. AI is going to infuse every single one of those.

So, the opportunity in both to these is so big. That is why I say we must have a maniacal focus because they should override everything else. And being the best at the platform and being the best with the skills to bring those to our clients is the role that we want to carve out for ourselves.

**DAVID SOLOMON:** So, you've been talking for the last few minutes about the upsides to this move to AI and the cloud. But there are also some concerns, particularly around security and privacy. And so, how do you balance these concerns with the positives?

**ARVIND KRISHNA:** Sure, David. And I'll separate security and privacy because while they often get intermingled, they're a little bit different. Right? So, privacy always comes down to if

I put my data somewhere, is it going to leak? Is somebody else going to see it?

I'll say something that I've been saying for more than ten years. If you're going to put your data anywhere but inside your desk drawer, go encrypt it. And go encrypt it in a way that you're not going to give the keys to somebody else. Because it's like saying if you lock your house and leave the key dangling on the door, don't be surprised if somebody unlocks it and comes in. So, a lot of people will encrypt it, but leave the keys accessible. Maybe to your cloud provider. Maybe to an administrator. Maybe to somebody else. You can't do that. You've got to step back and say, A, encrypt. Now go use appropriate encryption technology. Because I'll also tell you as an aside, it's likely that the prominently used encryption techniques today will get broken by quantum computers in our working lifetime. So, go worry about the correct techniques also. And those techniques are well known.

Next, keep the keys in a place that other humans, whether they're at your cloud provider, your other providers, your own employees don't really have access to them. So you must use techniques around hardware that keys themselves can be protected so that only those with the correct authority can get a hold of those keys, and only for the correct purpose. That's a big piece in privacy. I know it's only one tiny thing. Some of your [UNINTEL] are probably wincing, saying, "Hey, you just mentioned one out of a long list of 100." And I'll acknowledge it. But there are techniques to go solve that.

Once you get to security, it's a much more complex issue because security is compliance. And you guys probably understand compliance better than most people in the world. You've got to get intertwined. Are you doing what your regulator is asking? Are you making sure that you not only can stop bad things happening, but let's suppose bad things do happen, how are you going to react then? Right? All the words we use around preventive and compensatory, controls and so on. And you've got to build all those in.

**DAVID SOLOMON:** So, I noticed earlier today that you sent a letter to President-elect Biden congratulating him on his election and focusing on some areas of policy to help all Americans benefit from the promise of technological innovation, starting with the fight we're all facing against COVID-19. As we all eagerly await a vaccine, how do you see technology as a key to the future of that fight?

**ARVIND KRISHNA:** I think technology is absolutely essential to that fight, David. So first, we know that this is a virus we don't understand. How are we going to understand all the different therapeutics and vaccine vectors, and we have a half dozen today? And the ability to leverage technology as in supercomputing to go figure out what is the makeup, the genomic makeup of this virus, what could be possible, both vaccines and therapeutics against it is one? And we will do that with national labs and with governments across the globe. But then, how do we leverage artificial intelligence, maybe to get a much better understanding of how this virus spreads? How do we begin to get a much better understanding of what symptoms may lead to a much worse outcome? How do we begin to harvest all of the data to figure out the right protocols?

I really believe that this is a huge opportunity for all of us to go leverage artificial intelligence because if we do it the classic way it's going to take two to three years. And we don't have two or three years. We can go do it much quicker today.

The third area I'll mention is there's an economic crisis. Which means that we are going to need to educate everybody remotely. We should use AI, really, also to help improve how we deliver remote education and to improve on how we can keep people interested. Because yes, a highly motivated college kid may pay attention. It's really hard to believe that the ten-year-old is going to pay attention to a screen for six or seven hours. And so, how do we get them deeply interested by leveraging AI is the third way.

And the fourth I'll mention, which is maybe more soft, is I think there should be a national core of scientists and researchers that the government can call upon the same way as the military has reserve corps and so on, that the government can call upon to help inform them of the protocols they could use. Because I'd assert that if we had maybe listened a bit more to scientists, I'm not saying a lot, but maybe a bit more, maybe we'd be a bit further ahead of fighting both the health and the economic crisis than we are today.

**DAVID SOLOMON:** That's very, very well said. And I certainly agree with you. Best advice you've ever received?

**ARVIND KRISHNA:** Don't ever defer hard work. If something looks hard today and you defer it, it will become harder down the road when you do tackle it. So, if it's hard, tackle it now.

**DAVID SOLOMON:** That is a great piece of advice. And a great place for us to end. Thank you, Arvind. Thank you for doing this. We really appreciate the opportunity to hear from you and spend time with you today.

**ARVIND KRISHNA:** David, it's been a pleasure. And thank you to your audience.

**DAVID SOLOMON:** Thank you so much. Have a great day.

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