The Hierarchy of Digital Business

It starts with security and automation if you want to achieve your highest possible digital business potential, says Cisco's Ruba Borno.

Michelle Dennedy: Maslow's Hierarchy of Human Needs theorizes that before we can achieve higher states of being like morality and creativity, fundamental needs like food, water, safety, and security first must be met. Does the same hold true for innovations like digital transformation, or the Internet of Things? Cisco's Vice President of Growth and Chief of Staff to Cisco CEO Chuck Robbins, Ruba Borno, likes to say there's a hierarchy of digital business needs, too.

Cybersecurity, data protection, privacy. You like to stay ahead of the curve and listen to experts who are leading the way and deriving greater value from data, with a more organized approach to data privacy. You are like us, just a few deviations past the norm. You are a privacy sigma rider.

Hey privacy sigma rider, Michelle Dennedy here, Vice President and Chief Privacy Officer at Cisco, back at our nice, cushy sound studio after several weeks on the road. Our on-the-road guerrilla-style podcasting at Cisco Live in Barcelona was fun, despite the challenges of recording from a remote location. But I must say, it's great to be supported by professionals again. It makes me feel safe and secure knowing we have optimal sound quality back here at home. Security, it turns out is not just a basic human need. It's foundational for success with technologies as well. Such as the Internet of Things, or the IOT as it's known in digital business. Joining me in the safety of our studio to tell us more is Ruba Borno.

Doctor Ruba Borno, thank you very much. Vice President of Growth Initiatives and Chief of Staff to our CEO. Welcome, Ruba.

Ruba Borno: Thanks, Michelle, it's great to be here.

Michelle Dennedy: It's so cool to have you here. Ruba, can you tell us a little bit about yourself and your role here as vice president and also sort of, how did you end up here at Cisco? I think you started probably two, three months before I did, so she's, I consider her a senior leader in many ways.

Ruba Borno: Thanks, Michelle. Yeah, in Cisco years I'm still pretty new, but I've actually been here for quite some time now, since June of 2015. I started a month after Chuck was announced as CEO and joined the company as Vice President of Growth Initiatives and Chief of Staff. And what does that role mean, because a lot of people are wondering, what do you do?

The first was to focus on the portfolio strategy and that's actually where the digital analog came to Maslow's Hierarchy, and then operationalizing that through our business and strategy planning process, and then also other initiatives that help deliver on the strategy, whether it's competitive intelligence, or portfolio simplification, or even the incubating some new businesses, so I own the connected car business under me as well.

Michelle Dennedy: So it's incredibly complicated, and when you say portfolio simplification, it's also in a time of rapid change, so I got here I think two months after and here we are with a brand new CEO after sort of a rock star, John Chambers, exiting the business and also the world in such flux. So tell us

a little bit more, I want to focus for a minute on connected car, because that piques my interest both for your present and where we are in that portfolio. People may not assume that a company like Cisco, what are we doing with connected cars?

Ruba Borno: No, it's a great question, because you're right. A lot of people don't see the connection. But I'll take you back many years. So I did my PHD in electrical engineering with a focus on wireless sensors and those are the things in the Internet of Things. And in the lab that I was part of at the University of Michigan, it was funded by the National Science Foundation and also DARPA, we built sensors of all kinds, whether they're sensors that are environmental sensors, sensors that go into vehicles like sensors that are measuring the air pressure in your tires, and also sensors that go into the human body, either stints or even ocular implants, cochlear implants, and neural probes.

Ruba Borno: So I've been thinking about the Internet of Things for the better part of the last two decades. And connected car's just one of those things. If you look at the number of electronic devices in a car, it's growing exponentially. And they're adding more and more sensors every single day. Tesla for example, when they first came out with a car in 2015, that wasn't the first car, but the car in 2015 had about two cameras on it. Now they've got eight. And so that's just one sensor. Then they've got other types of sensors on there, whether it's the tire pressure, whether it's sensors knowing that you are in a vehicle, or a passenger is in your vehicle. All the other detections that's measuring your distance from the curb and seeing the lines on the road, that's growing at a pretty exponential rate to get to true autonomous driving, which is level five driving and you don't need a person actually guiding the car.

So when you think about, what could Cisco do to that; we have a history of convergence. Taking a whole bunch of disparate technologies and converging them onto Ethernet. And that's exactly what we're doing with the connected car business. And the reason that it's really valuable to car manufacturers is because it provides them a platform that's extensible for innovation, so they don't have to keep thinking about different harnesses or connecting things in different ways and doing things in the old way, which is bolt-on for new technology. It's really enabling them to have this one standard and then as they add more innovation, whether it's more sensors or other devices they want to connect in a car, they can use just this one platform and connect it to Ethernet. We've done that with voice, we've done it with power, and so the car is the next era of convergence here.

Michelle Dennedy: Yeah, and it's so much to unpack, and I love that, just the statement too, I just want to take a pause and underline, the wireless sensor is the thing. And it is the wirelessness of it, and the mobility of it that I think changes everything radically, from the time when you had reel to reel tapes on raised floors and as you say, DARPA was really looking at DARPA for DARPA. Governmental information management for a very, very specific purpose, and now you're talking about something as unique to each individual driver today, and eight cameras surrounding the car with information, and that's just the visual stuff. You know, we're talking about what's the fuel efficiency here? You know how are the injectors working, what's the lubrication level in the soluble lubrication of the actual mechanics?

So I love this idea, and this is also what drew me to Cisco, is this history of convergence. So let's talk a little bit more about, how do we converge digital? So that's just one Internet of Thing, thing that has really thousands of permutations before we get to level five driving. What does it

mean to converge hardware, software, chemistry, electricity, and then on top of that, right now we got to put people in the car, and when we get to level five, we still have people needs in the car. So anywhere you want to dive in, like where do you think this convergence is going, and why are you so excited and bullish about what we're doing here at Cisco about it?

Ruba Borno: Well, I'm really excited about Cisco and actually someone asked me that question, they said, "Why are you excited about Cisco?" And that's how I got to the Digital Business Hierarchy. Because in my view and I think a lot of us that work here, we believe that Cisco does provide the foundation to digitization and to enabling the Internet of Things. There's really a thoughtful sequencing that I think everyone needs to go through, independent of industry that they're in, whether you're in the automotive industry, whether you are in financial services or retail, or health care. The sequencing stays the same. And that sequencing starts with security, and I know that's obviously something that you're very passionate about.

Michelle Dennedy: I am.

Ruba Borno: But if you're digitizing your business, and you're optimizing for productivity or other performance metrics, and then you think about security, you kind of have to start all over again, because you're going to have to add in a bunch of new security products or features to enable your customers to be protected. So start with security. Then the second piece is network automation, because you've got to connect to the internet somehow, whether you are connecting to a private cloud or a public cloud, or edge devices, or all of those sensors that we just talked about. And you need to be doing that in a more automated way. The current way of doing things is actually quite manual, and we've been developing a lot of technologies to make that more seamless. And if we look ahead about two-and-a-half years, we're going to be connecting a million devices online per hour. You can't do that in a manual way. It's got to be done automatically and recognizing the device or the person the minute they connect.

The third piece is multicloud enablement, so then now that you've connected all these things, how are you going to enable them to optimally go, workloads to optimally go between clouds? You want to use the right cloud for the right workload at the right time, and do it securely. Now we're getting to the fun stuff, so if you're thinking of moving up the triangle of Maslow's Hierarchy, now we're getting into unlocking the power of data. You've connected all these things securely, you've got the data floating about different clouds, and you want to be able to get insight off of that data. And the majority of that data's actually quite perishable, so you've got to get the insight right away, and make it meaningful for the context in which the person is operating.

Ruba Borno: So, for example, in a car. You want to be able to make a decision right away to avoid the second lane because you can see the lanes in which you're driving. Moving on from the car to other sensors that I worked on, environmental sensors. So, for example, if you're measuring for biological warfare agents in an airport, you want to be able to detect that instantly and then call first responders right away, and that was actually some of the technology that the lab I was part of was working on. And some of the investments that we've made at Cisco include tying the analytics to business outcomes. So seeing if you can optimize your business process to deliver a certain business outcome.

And then now we get to the highest level of the Digital Business Hierarchy, which is the human experience, because it's not just about technology for technology's sake, as much as I love technology and I get geeked out on all of that, it's really about helping people do things better. And that's the goal there. And so if we can connect people to each other in different ways, enable them to work across the globe in a seamless way as though they are shoulder to shoulder, that's an amazing thing. And now you add in the power of machine-to-person communication and enabling them to act on all of the insight that was generated by the analytics, now we're helping people really achieve their full potential and help businesses achieve their full potential.

Michelle Dennedy: Yeah it's really, really cool, and I think the human experience is, if there's a theme kind of running through these conversations that we've been having, it's exactly that. And actually, I was really struck, I was listening to somebody talking about the transition from hardware to software to hybrid and business model, and they kind of, you know when you peel all that stuff away and it's not just the story of Cisco, it's really the evolution of the entire industry, when you peel that away and we'll go back to the Cisco example, it was geek one fell in love with geek two, and they decided to have a connection. And they decided to play with their favorite medium, which was technology, and build a bridge, literally build a bridge to have a relationship.

Michelle Dennedy: And I think we've come really full circle, to think about what are these pieces of human enablement that the power of data unlocks. And some of it is simply, running a business better so that people have more interesting and exciting things to do, and some of it is making sure that there's no risen in you know the airport terminal where I'm going to be later this afternoon, and thank you for that Ruba, because it's nice to be poison-free at the airport.

Ruba Borno: It's nice to be poison-free in a lot of places, but I think it just shows the power of connecting things and enabling people to act on them right away. I mean safety is just one example, because it's kind of all of us want to make sure that we're safe, but there's a bunch of other things that we can enable, and that's what's really exciting about this, is whether it's companies to be able to reach more customers globally, to be able to add new services to their offering, or people just being able to connect with their families in different ways. There's a whole bunch of you know, new things that used to just be science fiction about 30 years ago, and now we're seeing them and accepting them as almost a standard course of life.

Michelle Dennedy: Yeah I think that's right and actually, so we were at a meeting, a leadership meeting the other day, and a gentlemen stood up and said, "Yeah, my daughter's studying electrical engineering in college, but she doesn't want to go into it now because these aren't her people," and of course like a crazy person I am, I stood up and I was like, "I'm her people!" And so I followed up, and I was like, "Listen, like not for nothing but we can actually have video calls together," and we selfishly are going to be 1.3 million people down in cybersecurity and privacy and data control. I need every brilliant, excited, creative person who wants to walk up this hierarchy, the Borno Hierarchy of Needs, in the digital environment. She doesn't like that, she's like, "No, it's for Cisco," but it really came out of her head, so we're just going to give it to her as a sigma rider.

Michelle Dennedy: So where do we go? Like so we've saved work hunger, you and I this morning. What's next? What are you thinking about and working on and really excited about, I mean you've got a lot to be excited for in your day job, what's really driving your hope forward in this space? Or any space?

Ruba Borno: So one of the things that, I think it's frankly in any space. So one is helping customers go along this journey. Because like I said, it's independent of whether they're private sector, public sector, or any industry, helping them navigate this journey and doing it sequentially in a way that makes sense for their business is awesome, because it's bringing it to life. But I think the next thing that I'm really excited about, and it's a capability that we have at Cisco, but we're building and growing, is machine learning in service of artificial intelligence. And the reason it's really exciting to do that at Cisco is that, machine learning and artificial intelligence is really fueled by data. Lots and lots of data.

So the more data you have, the better it gets and the better the outcome is. And when we look at the amount of data that we have either going through our networks or the amount of security data that we see from our cloud infrastructure for the security delivered solutions, it's really exciting to think about the potential. One of the coolest, the innovations that we launched last year and I think some of your listeners know about it, is the encrypted traffic analytics, and it's being able to detect malware in encrypted traffic without decrypting it. Now what's cool about that is, it's based on network flow and actually raw network traffic, not net flow.

Looking at 100 to 150 data elements per packet as it goes through the network. And by comparing whatever the network traffic is to a bunch of previous network profiles or packet flow body language, we can tell is this something that's benign or is it malware. And we're continuously updating what that looks like every single day. We block 20 billion threats a day, so seven trillion a year, and that's how we're getting more and more data to be able to tell if there's malware in encrypted traffic. And actually we monitored the network traffic at Mobile World Congress, which is the largest mobile conference in the world, every single year in Barcelona, and so this year we monitored it and we saw that 80% of the traffic was encrypted, and then we were able to detect 320 significant malware events in that encrypted traffic. So the normal way you'd have to decrypt it, but we're able to preserve privacy but still determine if there were any attacks taking place.

Michelle Dennedy: I love it, it's really all about sort of taking a different perspective on it too, and saying, "How can I legally or how can I secretly, not legally, crack open these packets?" Has been the tail that the dog has chased for years and years. Talking to people on that team about what would it look like just to, exactly as you said, what's that package body language, and we're going to have the wonderful Annie Duke who has won the World Poker Championship talking about tells. Data has a tell. Data knows when it's supposed to be somewhere, and it used to be that heavy traffic at 2 a.m., when things were closed, that was a thing. And that's already antiquated methodology because now we're open for business 24/7.

It's very hard to find those bumps the way we used to and so, I think one of the things that I like to point out is just our inability as humans to really metabolize numbers. So when you say seven trillion a year analyzed, if you think about one billion seconds ago, that's 30 years. One trillion seconds ago, 30,000 years ago. Huge.

Ruba Borno: So I'll give you another number to compare it to, which is Google gets about 3.5 billion searches a day, and we're blocking 20 billion a day. So that just from a numbers perspective you think, "Wow, there's a ton of Google searches every day." There are, there's 3.5 billion, but we're blocking--

Michelle Dennedy: People can't have dinner without Google searches anymore.

Ruba Borno: That's true. It is a very helpful aid to a lot of conversations over dinner and conflicts and questions people have. But I think that you know the future of machine learning and AI is really exciting, and if you think of how taking all of that insight, and poker's a really cool example or just gambling in general. There's a customer of ours that's in Nevada, and they were seeing someone who was actually kind of winning in a card game. And they wanted to know, "Hey, does that person have a relationship to the dealer?" They looked at their camera footage and saw where that person, when they entered the casino, they then followed them backwards to their vehicle, got the license plate off of the vehicle, figured out which car rental that vehicle came from, got the name of the person and the driver's license of that person, and then did a search to see if they were at all related to the dealer and found out that they were the roommate of the sibling of the dealer.

Now if you think of the amount of disparate data sources that took place, whether it's video, whether it's searching a third party's data base and having that connection to a third party system, and then searching public documentation of where people live and their addresses, and then finally making that connection, in a few minutes frankly, I mean that's incredible amounts of aggregation of data to a specific outcome.

Michelle Dennedy: And a little creepy, not going to lie.

Ruba Borno: It's definitely very creepy, and I think you know it does cause us to think about privacy, and as people where all of our info is out there on the web, whether we want it to be there or not. Where we lived, where we've worked, all kinds of things, and what could be done with that data is really interesting, so that was one that was to the benefit of a casino, but you're totally right, it is pretty creepy as a private citizen.

Michelle Dennedy: But I think you're right. I mean I think I'll pick up on a phrase that I wrote down when you said it earlier, it really is machine learning in service of AI, and AI again, in service to as we said in the intro, Maslow's Hierarchy, you get to morality and creativity after you have the basics. So our ability now to assess a risk, and that's a business risk to the casino and a cheating risk or fraud, and maybe even a tax risk to citizenry, so there's all sorts of abstractions of that relationship. The next question is, what do we do from a moral perspective and an ethical perspective?

How do we really leverage that information so that if you're committing some sort of a wrongdoing, is the ML in service of all parties in a certain way, and I think that is for me of course, that's my current obsession. How do we build that ethics decision engine into the machine, and that's why I love that you're saying, "ML in service to AI," instead of the hype curve, which is like AI, the rise of Skynet and the robots taking over and it's happening tomorrow. That's not really a thing yet, but--

Ruba Borno: Not yet.

Michelle Dennedy: --Machine learning should be in service and will be in service and if you start down your digital hierarchy with security and privacy at that beginning foundation, you've already contemplated that. How do I support and not have a creepy factor? So I love that.

Ruba Borno: No, for sure it is foundational. If you really want to be creeped out about AI and Skynet, I think one book is called Our Final Invention, and you can assume what it's talking about with artificial super general intelligence and what could take place if we don't, if we're not thoughtful about how we program things. And I think that the word morality is a little sensitive. I mean for me the top of the hierarchy is really about realizing your full potential and achieving everything that you could achieve.

Ruba Borno: Morality and the ethics of AI is definitely something that needs to be debated a lot more often and a lot more proactively than it is today, because it is, these algorithms are currently based on some programmer decision making criteria, whether it's an outcome that they're striving towards, or you know they're optimizing for something. There's a solve there, and so thinking about how do we ensure that the aggregation of all those multiple solves gets us to an outcome that is aligned with our values as a society. That's going to be tricky. I don't think anyone has quite figured it out, and I think it's actually a whole lot more complex than I can pontificate on in a couple of minutes here.

Michelle Dennedy: No, but it's really important and I think this is part of the reason and I have the luxury in my job of really looking at, to the extent there are primordial standards around ethics. You know we hear they don't do naughty things, and what my moral is what's your moral, we actually do have people who for a living, shockingly to me, have found their way into ethics and ethical frameworks, and so that's where it's really fun to partner with those people and come up with what, you know if I had to recommend an ethical framework to you in your connected car, and this casino and it's business, and the travelers that knowingly go to Vegas to have this kinds of experiences, how do we talk about these frameworks, how do we teach ethics, starting from little kids upward? How do we inform our consumers of what they're consuming?

So I think there's a lot more exciting things ahead, so I'll give you the final word here Ruba, what gives you hope?

Ruba Borno: Well I think that what give me hope is, you know we're still a long way away from all of that true autonomy, and autonomous driving, or autonomous systems in general, but I think what's great is that the benefit from digitization today is so meaningful. Whether it's enabling us to innovate faster, it's enabling companies to manufacture things at a lower cost, and what that means is they can invest in innovation and deliver true customer value. The gap between where we are today and that kind of level five or artificial super general intelligence is pretty massive, but these steps that we're going to take in between are actually going to be exponential in terms of benefit.

Each one, we're going to realize benefits in operating expense, benefits in innovation, benefits to frankly all of the consumers that are out there, and citizens of countries as countries are able to deliver more services to their people because of digitization. So I'm excited about the in between steps, just as much as I'm excited about the north star, and I think that's what gives me hope is we're pretty close on a lot of in between steps, but I think we've got a big role to play here at Cisco in making that happen, and I'm really excited to see us continue to deliver on that.

Michelle Dennedy: I love it. I'm taking so many millions of notes that no one can actually hear. Doctor Borno, people want to hear more about this stuff, and hear more precise and extended version of your

hierarchy. Where do we go to find you? How can we find you other than trust.cisco.com where we'll link to whatever it is that you decide to link to?

Ruba Borno: Yes so on Cisco's webpage there's a, you can find on the exact bio some content that I've posted up there, whether it's a talk that I gave at one of our Cisco customer events, Cisco Live Latin America, covering the hierarchy or various blogs that I've written on this, and then also I'm not the only one discussing this. I think our whole company has embraced this strategy so, my boss Chuck Robbins also talks about it at Cisco Lives, and also our Head of Engineering, David Goeckeler and Rowan Trollope, two engineering leaders in the company, have taken it forward too. So there's definitely lots of content out there for people's consumption, so please check it out.

Michelle Dennedy: Excellent. Well she's trying to be humble, but Doctor Borno is yet another brilliant sigma rider, giant brain, and I like the whole theme around really how you live your life and exist, is really maximizing your own potential. You know you've done a lot so far, and I can only imagine. I mean it's fun to be a Cisco and you're a big part of the reason why this was such a great company for me to join too, so thank you for joining us today, and thank you for leading the way at Cisco. It's really fun.

Ruba Borno: Thank you for the time, it was a pleasure.

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