[MUSIC]

**KEVIN SCOTT:** We're not on some sort of inexorable path where we're building these technologies and like things are going to unfold in this very particular way that it's not inclusive. Like we get to choose our future, and I think if we make careful choices that that future can be like very, very inclusive.

[MUSIC]

**KEVIN SCOTT:** Hi, everyone. Welcome to Behind the Tech. I'm your host, Kevin Scott, Chief Technology Officer for Microsoft.

In this podcast, we're going to get behind the tech. We'll talk with some of the people who have made our modern tech world possible and understand what motivated them to create what they did. So, join me to maybe learn a little bit about the history of computing and get a few behind-the-scenes insights into what's happening today. Stick around.

[MUSIC]

**KEVIN SCOTT:** Hello, and welcome to the show. I'm Kevin Scott, and today we're going to turn the tables a bit. As some of you may know, I've just written a book called Reprogramming the American Dream. So, our guest on the show today is my co-author, Greg Shaw.

Greg was a journalist in his home state of Oklahoma, including editor of the Cherokee tribal newspaper. He went to work with Bill Gates, both at Microsoft and the Bill and Melinda Gates Foundation.

He is co-author of Satya Nadella's Hit Refresh, and a fellow rural native. Greg, I'm really glad that you joined us today to talk about the book, and I'm grateful that you've agreed to lend your word mastery and expertise to the creation of it.

**GREG SHAW:** Well, thanks, Kevin, it's great to be here with you, and it's really been terrific being along for the journey. You know, I got to go back to Gladys, Virginia, and I met your mother and brother. So, before we jump into the book, I must ask how they are doing?

We're talking in the midst of the COVID-19 crisis, and so I'm curious how your family in northern Virginia, and your family in rural central Virginia are doing.

**KEVIN SCOTT:** Yeah. So far, so good. Yeah, I think – I think that just as with all of the communities in the country, and throughout the world, the virus is coming. So, just because there aren't a lot cases at the particular point in time when we're recording this podcast doesn't mean that there won't be.

So, they're taking all of the precautions that they should be. You know, interestingly, the hardest person to get to abide by the shelter in place is my 90-year-old grandmother who has like a very active social calendar with all of her church ladies.

And so, I think two weeks ago we got her convinced that she needed to curtail her activities and keep herself at home, and so far, so good. Everybody's doing okay.

**GREG SHAW:** Yeah, yeah. Well, that's great. Well, let's jump into the book. As you said in your introduction, the title is Reprogramming the American Dream. The subtitle of the book is From Rural America to Silicon Valley, Making AI Serve us All.

And the book is published by Harper Business, and it's available now for purchase wherever you buy books. One of the first things that we talked about in – really, in one of our first discussions, was that you know, storytelling, as you say, is a Southern thing.

Tell me the story of the origin of this book, and the story that you wanted to write about.

**KEVIN SCOTT:** Well, I've been part of the development of technology for a really long time, and technology itself was the way that I was able to build a life for myself, like I think in a whole bunch of ways, like it really – it really saved me as a – as a kid.

It was the thing that I latched onto that helped give me something productive to do with all of the energy that I had, and like I just got really lucky that personal computing was emerging, right at the time that – you know, as a preteen, I was just trying to figure out what to do with myself.

And I got hooked and, you know, it has served as a platform, for me, for you know, building a career and for doing a whole bunch of things that, you know, I think have been helpful to other people, in at least some small ways.

And, you know, when I look at the state of technology, right now, like we have never had a more powerful platform in terms of technology. So, whether it's you know, like the set of things that we're using right now to record this podcast because we can't be physically approximate with one another.

You know, so this, the amazing networking technology that we have, right now, like computers that let us stay in touch with one another, and interact, and collaborate, and you know, do really interesting things wouldn't otherwise be possible.

But, like I have particularly been involved with the development of AI, for the past 15 years or so. So, like one of the first big projects that I worked on when I left academia to go work in industry was a machine learning thing, and I've just sort of watched this technology progress in both power and accessibility.

And, and like what I mean, in particular, by that is like power is like what you are able to accomplish with the tools and machine learning, and accessibility is like who is able to use these tools to create things?

It's just been on this incredible curve, on both dimensions, and I sat down to, you know with you, what is it now, two-and-one-half years ago when we started this whole process?

**GREG SHAW:** It seems like only yesterday.

**KEVIN SCOTT:** Yes, it does, but you know, the thing that I wanted to make sure was that people understood stories of how they could choose to use this technology to help build a better world for themselves and for their communities, in like this very inclusive way.

And like I wanted to make sure that there are things about the development of machine learning, and it's uses, that we need to be cautious about, but like I want people to also feel sort of hopeful about what it is that they can do with these tools.

**GREG SHAW:** Yeah, well, the podcast is Behind, you know, Behind the Tech, and one of the things that I've really enjoyed is learning your story, you know, from Gladys, Virginia, to you know, places like Illinois and Europe, and into Silicon Valley.

So, it's a really terrific story. I want to jump into the introduction here, and a topic on AI. In the introduction you addressed the question that is on everyone's mind, which is, when will general – or artificial general intelligence or AGI, when will it be available? You know, when will computers be as smart as humans? So, I'd like to ask you to read a passage from the introduction in which you address that question.

**KEVIN SCOTT:** Okay, yeah, I'd be happy to.

“Even though I have neither the expertise nor the crystal ball to predict exactly when AGI might arrive, I’ve been involved with modern technology long enough, and read enough history, to know that we’ve often underestimated the speed with which futuristic technology suddenly arrives.

AI has historically been limited in what it has been able to accomplish by the amount of compute power we can throw at AI problems, and how much time it takes for humans to encode logic and knowledge into AI algorithms.

We now have enormous amounts of compute power in the cloud, and we have enormous database of digitized human knowledge, and we have enormous databases of digitized human knowledge, like YouTube and the Kindle Bookstore, that can be used to train AI systems.

As our modern AI algorithms absorb that human intelligence to accomplish new tasks we imagine for AI-powered systems, we may achieve what Thomas Kuhn defined as a paradigm shift, one in which humans will either be in the loop or out.

Which one of these options we reach depends on our actions today, the story we craft, and the principles we assert about what kind of world we want our children to live in tomorrow.

I feel this profound sense of cognitive dissonance: the same thing that can advance humanity can also cause people distress and even harm. This book arises out of a powerful urge I feel to reconcile the two. It is an engineer’s tale, not the musings of a philosopher, economist, or screenwriter.

As Microsoft’s chief technologist, do I have skin in the game? Of course I do. But I’m also the product of rural America, one of the places most vulnerable to the dystopic story of AI. My values and many of my earliest experiences as a budding engineer occurred in a part of America, rural America, that is most at risk.

I left the rural South over two decades ago, first for academia and then for Silicon Valley and the tech industry. But at my core I am those people—rural people—and I care about creating a future that values them and their resourcefulness.”

**GREG SHAW:** That's great. Thank you, Kevin. I want to ask you to talk a little bit about AI and how you define it. You have a very savvy tech audience for this podcast, but you also wrote the book for people in your community, back in Virginia, and for others.

My father read an early proof of the book. He's an oil and gas guy from Oklahoma, and he said he felt like, for the first time, he had a grasp of AI and what it might mean. How should we define for ourselves; how should we think of what AI is?

**KEVIN SCOTT:** So, AI, on the one hand, is a[n] incredibly complicated assembly of technologies. It's not just one thing, but maybe the simplest way to understand what it does, or like how to think about it is that AI is a tool that we built for automating tasks and doing work that would otherwise require a human being to do.

And like a lot of the work that AI does is sort of cognitive sorts of things. So, the you know, people talk about this notion of artificial general intelligence, and like this was the holy grail for AI back in the mid-1950s, when a group of mathematicians, engineers and computer scientists coined the term artificial intelligence for the first time.

They wanted to build a set of software and digital systems that were functionally equivalent to human intelligence in the most general terms. So, you know, could you build a thing that was sort of indiscernible from human intelligence.

And what we found over the years is doing that is incredibly hard. You know, one of the things that I write about in the book is that human intelligence, itself, is sort of ill understood, and so – you know, in the early days of AI, the things that the founders of the field thought were going to be the problems that one solved would be, okay, now we're over the hump.

Like we're, you know, we've got this whole thing nailed, were things that we believe are high-cognitive watermarks for human intelligence, like being able to master chess, and so it turns out that AI systems are pretty good at doing things like gameplaying.

And so, we – you know, we built AI systems that could beat the best human chess players, years ago, and like even over the past couple of years, you know, some of the most remarkable stunts that we've done, with AI, like with the most modern AI tools are like conquering a set of games where, you know, like we had set them up, you know, one after one, as I go.

Like, once we get here, we will really have cracked the nut, so to speak. The flipside of that is that AI still isn't able to solve very basic problems, like things that, you know, a human toddler can do are at the moment outside of the grasp of AI systems.

And so, you know, one of the things that I would love to encourage people to think about is like it's sort of very difficult to draw parallels between artificial intelligence and human intelligence because, just because something is hard and challenging for a human being, doesn't mean it's going to be hard and challenging for a machine.

And, and vice versa, just because something is easy for a human being, doesn't mean that it's going to be easy for a machine. So, in my opinion, the best way for us to think about AI is imagine it as a tool. It is a tool that can help us to automate tasks and to assist human beings in doing the work that they think is important.

And when you look at it through that lens, like it becomes an incredibly powerful problem-solving tool, and again, you know, one that I think is increasingly accessible for everyone, for you know, going in and tackling some, you know, really, really important issues that like we as human beings need to tackle.

And where most of the benefit is going to be, you know, creating this abundance that doesn't exist before because we simply don't have enough human horsepower to solve the problems in a way that creates benefits for everyone, if that makes sense.

**GREG SHAW:** No. That's great. You know, one of the thing we really wrestled with in writing the book, you know, the first several chapters of the book tell some great stories, and you know kind of develop the narrative.

The, the latter part of the book, you know, presents some promising stories and case studies, but where we really wrestled is, you know, in the middle of the book, you wrote a chapter called, "How Models Learn."

This is Chapter 7 of the book, and you talk about things like supervised learning and deep neural networks. Do you want to maybe geek out for a minute on why those things are important in thinking about AI?

**KEVIN SCOTT:** Yeah, so, I think it is very useful for folks to have at least some high-level concepts in their head about how AI works. You know, and I'm going to go super-fast, and this is one of the challenges with writing the book.

Like that chapter might have been the most difficult thing to write because I was trying to make it accessible for folks like your dad and my mom, and still, you know, hue closely up to like the deep technical complexity and nuance of what actually is going on, on the front lines of the field, as these technologies are being developed.

But, but, so like, roughly speaking, you can sort of think about the first epoch of AI as one where we thought we were going to be able to encode human intelligence as a set of like logical rules and sort of describing knowledge in these very structured ways, and that like we were going to be able to sort of build up intelligence by like this very sort of rational, logical, sort of – I think I called them systems of reasoning in the book, and progress was interesting, but relatively slow, like we were not moving as fast as some people would have liked in the field, and like we had these periods of, you know, very high excitement about AI that led to these booms of activity that were followed by a bust, where you know, the hype sort of exceeded what was realizable by the technology.

And like there's even a term for this, called the AI winter, and like I've actually seen one AI winter in my lifetime, and there was that – that occurred before I even, you know, became a computer scientist.

And so, the thing that's happened over the past, let's say 15-20 years is we have gone from these systems of reasoning to systems of learning, so things where instead of us trying to discover the logical rules of intelligence, and the structured way to map the knowledge of the world, what happens in systems of learning, with machine learning, you are able to train a system to recognize patterns in data.

And so, if you have a large amount of data, and like enough compute, you can run a learning algorithm across all of this data to get – to build a model, and a this model, built from this data, is able to do a set of things called inferences, that lets you make judgments, and predictions and classifications about things in the real world.

And like it's a really powerful pattern. It's like the thing that we use to do a bunch of perceptual things that have seemed extraordinary over the past handful of years. So just since 2012, like we have really made super-fast progress using a set of techniques called supervised deep learning to be able to accurately transcribe spoken word, speech to text, so the speech recognition.

We have made huge progresses in computer vision, like where computers can identify the objects in still images, and like even in video streams, with accuracy similar to a human being, like we're able to do machine translation where you can sort of take a snippet of text in one language and translate it into another.

And so like there are just all of these extraordinary things that we've been able to accomplish with this set of techniques called supervised learning, and the reason that we call these techniques supervised learning is that you have to have human beings labeling the data.

So, like if you want to build a computer vision system that's able to recognize or discern the difference between buckets and kittens, you would have to go assemble like a huge collection of images of buckets and kittens, and you would have to have these images labeled.

So somebody would have to sit down and say, hey, this picture has as kitten in it, and this picture has a bucket in it, and you would have to have kittens of shapes, sizes, breeds, colors, fur texture, in different positions and poses, under different lighting conditions.

And the same thing for buckets. And so you would feed all of this, you know, sort of labelled data into your learning system, and it would produce a model that can accurately identify, you know, buckets and kittens. And so, it's fairly expensive in terms of the effort required to do all of this labeling, that –

**GREG SHAW:** Yeah, and then – and then you end up with a – maybe a picture of a bucket with a kitten in it, and really confuses –

**KEVIN SCOTT:** Yes, and yes, you can really confuse the system, but you know, one of the interesting things that's really happened over the past couple of years, and that's going to be like one of the driving forces for the next few years is we have really figured out, in a bunch of areas, how to do this thing called unsupervised learning, where you can bypass most or all of this labeling step.

And you can just sort of point the learning system at a whole bunch of data, and you can have it sort of figure out a bunch of very complicated structure about, the data that you're then able to use to build very, very powerful systems, without having to bear the expense of this supervised, you know, labeling process.

And that's the you know, the set of things that have really been driving progress in natural language processing over the past couple of years, where we've gotten some really sort of extraordinary results with question answering, with systems that can generate very plausible links of text that sound like they've been written by a human being.

And so, like we're making really, really fast progress there, and the interesting thing about it is, you know, when you’re able to do unsupervised learning, the only thing that is bounding your progress, at least right now, and like we may run into, we may run into boundaries sometime over the next handful of years, is the amount of compute that you can throw at the problem, and the amount of data that you have to train.

But, you know, the interesting thing is like we've got more compute now than we ever have, and you have the whole Internet full of data to train on.

**GREG SHAW:** Yeah, yeah. Well, let's switch from the text to society. You know, you dedicate the book to your father. In the book, you write a letter to your grandfather, Shorty, explaining to him. He was a – obviously, a craftsman and someone who would have been fascinated by AI.

I mention this because, you know, the book is titled Reprogramming the American Dream, and you had your family and other families in mind. What's involved in reprograming the American dream, and what do you mean by the American dream?

**KEVIN SCOTT:** So, I think that we have an opportunity with better investment in advance technology, and like making those investments in a way where they're accessible to as many people as humanly possible, to have people in rural and middle America have the opportunity to create really very interesting new businesses, that create jobs and economic opportunity, and that help them realize their creative vision.

And that, you know, serves as a platform, in the same way that industrial technology serve as a platform for these communities to build their economies in the you know, in the early mid-20th century, that AI can have a similar sort of effect in these communities today.

**GREG SHAW:** Yeah, you offer a number of different suggestions related to education and skilling, and that sort of thing. I'm curious, what would you say is your advice to young people who are might be growing up in rural central Virginia or Oklahoma, where I'm from? You know, how should they prepare for jobs of the future?

**KEVIN SCOTT:** Yeah. I think, I've chatted with a bunch of people about this over the past few weeks, and you know, when I get this question about what we need to do to make AI accessible to those kids in rural and middle America, yeah, some of the things that we need to do are just very prosaic, I think.

So, the tools themselves have never been more powerful. Like the really interesting thing to me is that first machine learning project that I did, 16 years ago, now, required me to sit down with like a couple of graduate-level statistical machine learning textbooks, and a whole stack full of fairly complicated research papers.

And then I spent six months writing a bunch of code, from scratch, to use machine learning to solve the particular problem I was trying to solve at the time.

If I look at the state of opensource software and cloud platforms, and just the online training materials that are available for free to everyone, a motivated high school student could do that same project that I did 16 years ago, probably in a weekend, using modern tools.

And so, you know, I think that the thing that we really need to be doing is figuring out how to take these tools that are now very accessible, and like we shouldn't feel intimidated by them, in any shape, form or fashion, and figure out how to get those into high school curricula so that we are teaching kids in a project-oriented way, like how to use these tools to solve real world problems.

I think getting kids those skills is super important. Like the other thing that we need to think about is just how we're connecting people to the digital infrastructure that is going to increasingly be running our future.

And so, you know, there are things like the availability of broadband that are a huge, huge deal. You know, I think we write about, in the book, my visit to our datacenter in Boydton, which is in Mecklenburg County, about an hour-and-a-half, two hours away from where I grew up.

And this is one of the most sophisticated technology installations anywhere in the world. Like there's an enormous amount of network bandwidth coming into this facility, and like the amount of compute power that is just in this sort of acres of datacenter infrastructure that we have there is just staggering.

And we have a bunch of high-skilled technology workers who are building and operating this infrastructure, on behalf of all of Microsoft's cloud customers. And some of those people who are living in that community struggle to get access from their local telecommunication providers to the high-speed broadband that they expect. Like, they are, you know, they're information works, like they expect in their homes to like have good broadband connectivity.

For students, like it's even more critical. Like if you don't have a good broadband connection that's available to you, somewhere, as a student, like you're never going to be able to go find these opensource tools to use these free or cheap cloud platforms to like go learn all of this like very accessible knowledge that is on YouTube.

And so, sometimes, I think it's the, you know, the prosaic things that like we're making more complicated than the complicated things.

**GREG SHAW:**

Yeah, well, it was interesting, you mentioned Boydton and, you know, some of the places where Microsoft has datacenters, we had a chance to visit, and in those communities - we encountered this in Iowa, as well, when we were reporting there.

You know, a lot of these high schools, have been preparing students for kind of legacy jobs. In Wyoming, a lot of kids who can, you know, go get jobs in oil and gas. In Virginia, you know, it used to be, as you write about, tobacco and furniture and –

**KEVIN SCOTT:** Textiles.

**GREG SHAW:** Yeah, and textiles. You know, what we discovered, and I'd love to hear your thoughts on this, is you know, the high schools needed to begin to introduce some digital skills, and then the community colleges, where many of those students would end up going for post-secondary, also needed to create a sort of ladder toward the skills needed in those datacenters.

**KEVIN SCOTT:** Yeah like it's absolutely true, and then I think, you know, the thing that both of us saw, and like this was sort of a really, really striking thing to me, and I don't know why I was so surprised by it because in retrospect it's really obvious.

Like I think one of the things that you really, really have to have in these communities, if you want kids to choose to study these concepts, to acquire these skills, to like graduate from high school and to, you know, sort of pursue further training, either on their own, or community colleges, or going to a, you know, a four-year school to get a technical degree.

Is like they have to have role models. Like I think this is one of the very luckiest, quirkiest breaks that I had, is my great-grandfather, my grandfather, and my dad were all in construction, and the very easiest thing for me to do, and like I've got to say, even though I was in love with computers, like there was still a part of me that was tempted.

Like I asked myself like why wouldn't I go into the family business? And like I don't, like and that would have been okay. Like I don't want to make it sound as if like going into construction is problematic in any shape, form or fashion.

Like there is an enormous dignity and satisfaction in doing jobs where you're, working with your hands, and the world needs those things, but like in these communities, like I think you need a balance. Like you want some people to choose to go do those things, and you want some kids to choose to go pursue careers in IT, or security, or like learn how to use the machine learning tools, and like become developers, or machine teachers, or be prepared for the careers that don't even exist, right now, that are going to emerge over the next couple of decades.

And in order for them to do that, like we have to inspire them, like they have to see people around them that they admire, or you know, people who are online, or wherever. Like they just have to have role models that – where they can say, okay, like I am like this person, they are telling me that like I can do this thing.

And like, and they're showing me why it's interesting, and you know, I think we have to have that, as well as the education, in order to get kids to want

**GREG SHAW:** Well, and you speak with quite a bit of knowledge of this. I was very pleased to meet your wife, Shannon, during the process of working with you on this book.

You and Shannon have a foundation that focuses on education. Do you want to say a little bit about that?

**KEVIN SCOTT:** Yeah, I mean, the foundation very broadly looks at how it is that we can knock down systemic obstacles to children reaching their full potential, and like a lot of that's about education and educational equity.

And like some of it is about, again, you know, if you do full system thinking about these things, it can even be about access to food and nutrition. Like a lot of the early childhood developmental things that we see is, you know, like if you have a kid who comes to school hungry, they can manifest a bunch of behaviors that look like attention deficit hyperactivity disorder.

And have, you know, just sort of behavioral issues that distract them from being able to learn what they need to learn in their classrooms, and so like the – we just sort of have to think about the full, end-to-end, set of problems that we need to solve to let every kid unlock their potential.

And like one of the things that we, you know, in the local organization that we work with, that are trying to get kids educated, is you know, even here in Silicon Valley, it's like not just about the skills, it's about creating the support networks for people where they can get encouragement and positive reinforcement.

Like it is so hard. And like both my wife and I saw this, because we were the first you know, we were the first – like our parents didn't go to college, and so we were trying to figure out, like all of this stuff, early in our lives, about how it is that we were going to go get a college degree when we didn't have –

We didn't have maybe as much support as we could have had, you know, just because our parents, you know, were trying their hardest, but like they didn't know how to guide us, necessarily.

And, and so, you know, we see – you know, there's this great organization here in Silicon Valley that's actually a franchise of a nationwide organization called Breakthrough, and so Breakthrough Silicon Valley works with kids to make sure that they get into college and they graduate from

And they, you know, start working with them when they enter middle school, and they just look at the full problem of like how do you, you know, what are the role models for these kids, like what are the patterns of success?

Like can you show them like a bunch of people who walked similar paths that they did, and like they graduated, and they're having great careers? Like how do you get the people who are graduating and have great careers to give back to their community?

Like it's a really fantastic organization and a really fantastic way of looking at these problems, and I think, you know, again, when we go back to rural communities and, and middle America, where we want our kids, not just to acquire these, you know, digital skills, but we want them to choose digital careers.

And like we want them to like stay, be able to stay in their communities, to practice these digital skills, so that you know, they – you're building a foundation and an infrastructure in these communities where, you know, where – where the community can fully participate in the economic engine that's going to drive a whole bunch of you know, a whole bunch of like how the future unfolds for all of us.

**GREG SHAW:** Kevin, you had a number of people read the book and give you comments, people, you know, from lawmakers to people who live in rural communities, to you know, the tech digerati of the Silicon Valley, and Seattle and other places. What are people taking away from the book, and what do you hope they take away from the book?

**KEVIN SCOTT:** I think almost everyone, so far, who has given me feedback about the book and like maybe there's some bias - biased set of folks in the – like I haven't had anyone come to me yet saying, oh, this is a horrible book.

But, you know, the thing that people seem to be taking away from the book is like, oh, this stuff isn't really as complicated as I thought it was. And, wow, I actually do now have hope that there is a path forward for developing and deploying very advanced technologies for like a very sort of set equitable benefits.

And like the most important thing that I want people to take away from it is like we're not on some sort of inexorable path where we're building these technologies and like things are going to unfold in this very particular way that it's not inclusive. Like we get to choose our future, and I think if we make careful choices that that future can be like very, very inclusive.

**GREG SHAW:** I want to ask you, during the course of researching and writing this book, is there – I wonder if there's a particular moment, either when you were, you know, traveling with the Rise of the Rest Fund, or going to Iowa, or you know, any of the moments along the way that, you know, particularly struck you, either concerned you, or gave you hope for the future.

**KEVIN SCOTT:** Well, I think there's a really fantastic set of people in a bunch of these communities who are pushing very hard on a similar set of things.

So, like, there's just an increasing amount of capital that is starting to flow into these technology companies that are in places that are outside of the coastal urban innovation centers, that we all are sort of familiar with and talk about, all the time, which I think is a really incredible thing.

Because what we got to see, as we were visiting these places, is that there are brilliant people everywhere, just ingenious, industrious, you know, sort of incredibly inspiring people, doing really good work, all over the country.

And us collectively choosing to invest in what they're doing is really, really important, and I've seen a bunch of these folks using technology in very interesting, interesting ways.

So, like I know all of the capabilities are there to employ the most advanced tools that we have possible, and in a bunch of places that, you know, they're already on this path of being able to leverage technology to, you know, build better businesses, to create more opportunities in their communities, and to solve a set of problems that they are uniquely situated in and positioned to solve.

But like they're at the very beginning, and that's the thing that gives me so much hope. You know, I'll go back to my, you know, most oft' quoted example, which is my friend Hugh E’s, this company that he works at that does precision plastics machining.

Like they built a really good business in this small town in Campbell County, Virginia, where they're using the Internet to market to and communicate with their customers. They're using really advanced software to be able to program automated machining equipment to make these very high precision parts that they're then able to, you know, deliver to customers, all across the country.

And because they're able to leverage really advanced technology, they're competitive, and so their problem is you know, they would love to be able to hire more people to work there, and like they just sort of need the people with the you know, these sort of modern skills.

And all of the tools that they're using are all on this almost Moore's Law for machines, where the amount of dollars that you're spending on the machine is getting less and less over time, as a ratio of the value of the things that the machines can produce.

So, like, yeah, in other words, in the same way that Moore's Law said you've got more compute per dollar, like you're able to do a more valuable set of things with these automated machines, per dollar that you spend on them.

And like that's a really exciting thing, and like when – I didn't expect to see that when we went to Virginia, but as soon as I saw it, like I saw anecdotes, everywhere, like all of these companies that were following the same pattern, where there were businesses that were starting to like serve some very important need in the marketplace, where their ability to be competitive, and to like, you know, move jobs back into their communities that had been outsourced to, you know, some sort of larger concern, or like had been moved overseas.

Like the reason they got to repatriate those jobs into their communities was because they were using technology, and like it's a really inspiring thing to see, like I – if we had never actually published this book, I would have been happy to have undertaken the project, just to see all of that happening, and to like just be inspired and fired up by it.

**GREG SHAW:** Yeah, well, that seems like a good place to end, but I want to ask you to read another passage that's along these lines, and which you write very movingly about your community, and about the communities in this book. I wonder, would you read one last passage for us?

**KEVIN SCOTT:** Sure.

“So, there's this disinterested, even disdainful attitude that people can sometimes have about those who choose to live in different places, who choose to pursue different paths in life.

It's very easy to surround yourself with the same news sources, the same political views, the same entertainment, the same activities, and the same culture as everyone else around you.

With modern technology, with more of our time spent online, and on our devices, and with more and more of our connections with one another mediated by social networks, it's hard to avoid becoming trapped in self-reinforcing filter bubbles, and then not to have those bubbles exert their influence on other parts of our lives.

Many of my friends and colleagues see those living in rural communities, people who live outside of the urban innovation centers where the economic engines are thrumming, right now, in a very different light than I do.

That's not just unfortunate; it's an impediment to making the American dream real for everyone. The folks I know in rural America are some of the hardest working, most entrepreneurial, cleverest folks around.

They can do anything they set their minds to, and have the same hopes for their futures, and the futures of their families and communities, as those of us who live in Silicon Valley and other urban innovation centers all do.

They want their careers and their families to flourish, just like everyone else. Where we choose to live shouldn't become a dividing line, an impediment to a good job and a promising future. That's the American dream, and it's on all of us to make sure that it works.”

Because in a certain very real sense, if it doesn't work for all of us, it won't work for any of us.

**GREG SHAW:** Kevin, that's great. Thank you, very much, and we'll wrap it there. It's been a fun conversation.

**KEVIN SCOTT:** Yeah, thanks Greg, so much. It's been great to have you on the show, at last.

[MUSIC]