HBR PRESS WEBINAR: RADICALLY HUMAN
VIDEO TRANSCRIPT

Sally Ashworth:
Okay. Thank you for joining us. My name's Sally Ashworth, head of media for Harvard Business Review Press in the UK, and today I'm pleased to welcome Paul Daugherty and Jim Wilson. Paul is the Chief Technology Officer at Accenture in New York, and Jim is Global Managing Director of Thought Leadership and Technology Research at Accenture Research in San Francisco. Together, they're the authors of the new book, Radically Human: How New Technology is Transforming Business and Shaping Our Future. In it they show how leading companies are going beyond the use of machine/human collaboration, towards even more human, more humane technology. As Jim and Paul describe it, artificial intelligence is becoming less artificial and more intelligent. This fascinating subject is the focus of today's event.

Paul Daugherty:
Thanks to everyone that's joining and listening. Jim and I are very excited to tell you about Radically Human that you see the title on the screen here. So, we'll unpack a little bit what radically human means and what the key messages are in the book. So really looking forward to the time together. I'll start in and turn over to my colleague, Jim in a few minutes, and I'll start with just context to lead into what we mean by radically human. Stepping back, just say at the outset that, we're all busy day to day, jobs, everything we're doing, and we sometimes lose sight of the fact that we're living in really exceptional times and exciting times. We're in the midst of this technology revolution that's been going on for 70 decades, since the invention of the transistor revolutionizing computers and computation, digital technology,

et cetera, and where we are right now is at an incredibly exciting point with a real acceleration of a lot of technology capabilities that have been built over that period of time.

And what we're doing in Radically Human is showing how we see this inflection point from today to the future, playing out. And the message of Radically Human, in a nutshell, we'll talk about this throughout, is that technology itself is becoming more human-like in its capabilities. Artificial intelligence and other technology is a good example of that. And the point we're making in the book is that more human-like technology, these advances in technology create really radical new leaps and steps forward in human capability, human potential.

That's really the argument of the book is these increases in more human-like technology drive even greater steps in our own human potential in the way we work, live and play, and that's what we're talking about in the book. If you go to the next slide, more on these times we're living in. What are some of the forces that are causing these changes? And you should see a slide that says five forces on it. And these are forces that we believe will shape the next decade, and I would argue to you that the next decade that we live through roughly till 2030 will have more change than the last two or three decades you've been through. When you think about it, the last, three decades ago, we didn't really have an internet. We didn't have mobile phones, et cetera. So tremendous change ahead.

What are the five forces that'll shape the next decade? The first one we talk about as total

enterprise reinvention. Total enterprise reinvention is the application of digital technology and everything that we're doing, cloud data, AI related technology to every part of every business. And we're really just starting the journey down that path. Now with all the technology we've built in our businesses to date, we'll talk about that a lot more as we go through. The second of the force of shaping the next decade is talent, and talent will be a key difference maker. How we equip talent to use the technology and create through to human capability, and the talent that's needed to build the technology. That'll be a differentiator for companies going forward is their access and their ability to create and develop the right talent.

The third key force is sustainability. A lot of the improvements in sustainability will be driven by technology and major improvements will be driven, not just in measurement, but in actual solutions, to sustainability challenges driven by the way that companies deploy technology. The fourth of the five forces is the metaverse. And you may be surprised to hear me talking about the metaverse is that important of a force, but I do believe, and we believe that the metaverse will transform business and consumers, the way we work and live, more in the next decade than the digital revolution has changed companies and consumers, the way we live and work, to date. So a tremendous change ahead is the metaverse comes online from that perspective more.

And then finally, we have to keep in mind that we're living in an ongoing tech revolution and there's biotech and material science, other things that are increasingly driven by improvements in digital technology, and that'll generate new advances and new changes as we go. So those are the five forces. What we argue in the book is that you need a new mindset in response to these forces. And that's what Jim and I will spend the time talking about, is that it's a radically human outlook and a different outlook that you need to operate in the world of these five forces. If you go to the next slide, it's really about how we equip and empower people,

humans, us as humans to use the right technology that'll really differentiate companies, their performance. Algorithms are important, algorithms make a difference, but it's the humans and the role of people and how we engineer the technology in the right way that'll drive that change. Jim will get into this more in detail. It's what we're really suggesting is a very different approach to how you deploy technology and flipping and changing some of the assumptions and how we've deployed technology to date, to lead to these different outcomes, and that's the roadmap that we lay out in the book.

And if you go to the next slide, let's just talk about some examples of, so what do we mean by this? And there's some examples you see on the slide or some representative pictures from some companies that exemplify these trends. One example is Sage, which is in the bottom left, but it's a university originated project called Synergistic Anticipation of Geopolitical Events. You may not remember that, need to remember that name, but it's a very interesting approach combining human insights and data and AI together so that's the human insights plus the technology that can make far better predictions than a machine could, or then a human could, on its own. So interesting project in that sense. There's work, we talk about in the book from Buhler, which is in the bottom center of the screen, showing an analyst from Buhler, but Buhler's a food processing company that's using technology plus new human approaches to trading the technology in their grain sorting process, their food processing company, to do things differently than they could before. The top right shows the NFL, the National Football League, the primary American football league in the way that they're using technology to create highlight reels from films that's human guided in the way that the highlight reel are connected, but far more efficient and far more effective in terms of the impact that the highlight reels have for the fans by combining the two approaches.

And I could go into more and more of these examples you see on the page, and we're going

to unpack more of them as you go. That gives this illustration in the theme that it's really not the human or the machine. It's more that it allows us to do something that's more than what we can do as humans and more than what the machines could do on their own. And then if you go to the next slide, you might ask, "So why now? Why are we talking about this now?" And there's really three reasons we're talking about it now. The first is, partly what got created by the impacts of COVID and one of the outputs of COVID, which was this great acceleration in the use of technology. And you see some stats on the screen here. The pace during COVID, the pace of technology adoption increased by 70%. The pace of this is very significant. This is based on research Jim and I did for the book. The thousands of companies that we talked to. We also saw the first-time adoption of technologies was 63%, which is very striking. Companies were using technology in different ways they had a license to innovate, because the need to do things differently. And we talked about many examples of this in the book. One company we talked to that accelerated the use of augmented reality for plant inspections, and it did it far more effectively and efficiently using a new technology that had only been on the drawing books before COVID happened, using it for real, as an example. And another thing we saw during COVID is that, before COVID, there was a gap between digital leaders and laggards, and the gap was about 2X. Leaders, the top 10% that were applying tech, digital technology, cloud AI, and others, better than the rest, were outperforming the laggards by a factor of two X. And one of the surprising things to Jim and I as we did this research is that that gap widened when we looked at the effects of COVID. It widened to 5X. So those that had the right technology in place widened their lead, and we also saw a new class of leapfrogs who, and I think many of you have seen this in a lot of companies who started to use technology more aggressively, started to pursue compressed transformation, to get to the new technology in place more quickly to drive their business advantage. And those leap froggers drove up, it was about 18% of companies that are also

driving greater results than the average. So this is the great acceleration that happened, which is something we write about in Radically Human. The second change on the next slide of why this is relevant now is, this all changed human behavior, and human behavior continues to change. The way we work differently. The way we use technology differently. The way we shop differently, contactless experiences, et cetera, this is all dramatically changing the way we as people use technology and that shift is still underway. And it's something we talk about a lot in the book and why, understanding human behavior and the way we create human experiences is a really strategic thing for companies.

And then the third change we talk about in the book in the next slide, is the evolution of technology itself, and technology, pandemic and inflation and things we talk about as great global uncertainties, they can slow some things down, but what they don't slowdown is the pace of technology innovation. The one certainty you can count on, regardless of other events around the world is that this pace of technology change will accelerate. And I think that's an important factor to consider as you develop your strategy, and why in the book we talk about new forms of strategy that we believe are necessary in this era that Jim will describe in some more detail.

So you've got these three factors. The great acceleration in the use of technology, these changes in human behavior, and the ongoing evolution of even more technology coming that leads to why Radically Human is important now. And that's what's happening.

Now the so what, if you go to the next slide, is that this is creating, we believe, a really new era in our opportunity to use technology. We're going from an era where the machines were in charge, and I can remember the days of, when we were optimizing limited memory usage and green screens and things, but even recently, we generally have optimized around the use of technology and what machines can do and be programmed to do, and then the people had to

catch up. We did training, we did change management for the people to catch up. That was where we were.

If you do a click, in our last book, we wrote about human plus machine, which was the collaboration using data and AI and other technologies to create more of a symbiosis between human and machine. That was the second kind of era. We think we're now moving to a third era of radically human. And radically human is where the more human technology enables people to operate in this new way, as I talked about at the outset. So, that's the opportunity. I think those companies that see this radically human era, and understand how to anticipate it in their workforce, with their consumers or citizens, depending on the nature of what your organization does, are going to be positioned for success. So with that, I'm going to turn over to my colleague and partner on the book, Jim, and he'll talk through a little bit more detail in terms of Radically Human and how we bring it to life. So Jim, over to you.

Jim Wilson:
Thank you, Paul. So, as we move into this era that you're talking about, this radically human era, we believe that a new formula of business success is now emerging. And to begin to solve this equation, business leaders must flip, and we use this word extensively in the book. They must flip commonly held assumptions around five business fundamentals, and these are intelligence, data, expertise, architecture, and strategy. So with IDEAS, companies, large and small, really have an innovation framework to begin to reevaluate and even revolutionize the core building blocks of the enterprise. And we're going to come back to that term "revolutionize" a bit later. So they can turn those long held assumptions on their head and really prepare to innovate in a world where the human and the humane will be the way that companies compete and the measure by which they're going to be judged.

So let's begin by talking about intelligence or artificial intelligence, and Paul already teed it up

really well. I think the most prevalent AI technologies that we see in business today involve a technique called deep learning, which is based on neural networks learning from large data sets, and indeed, deep learning is responsible for many of the powerful business uses for artificial intelligence over the last decade. Uses that we talk about extensively in our last book, Human + Machine. For instance, fraud detection and forecasting sales more effectively. Computer vision systems that are used in factories and web searches. But technologies based only on deep learning, really have little sense of cause and effect, and space and time and other fundamental social concepts that us human beings naturally call on to move through the world. And that's a big limitation, and we've been tracking that limitation since our last book.

Now though, a number of pioneering researchers and companies are creating applications and machines whose reasoning ability is really more adaptable and more savvy, more like the way that humans approach problems and tasks. And since we published Human + Machine a few years back, we've really seen a remarkable increase in research and corporate pilots in this area. And let me give you a few examples of what I'm talking about. So, in emotional AI research, for instance, the company Affectiva has created algorithms to design, that are really designed to read people's faces to detect their emotional and other cognitive states, and this area of effective computing or emotion AI grew out of work with autistic children, to help them understand and better express their emotions. And today we're seeing developers of this technology working on building an emotional enabled digital world that can provide online learning and virtual meetings and better telehealth, to help restore human connections in our digital collaborations, many of which have, of course been lost a bit during the pandemic.

AI from Covariant, which is a startup founded by robotics researchers from the University of California Berkeley, and the research lab Open

AI, powers robots with the abilities to sort and manipulate objects, and to quickly learn to adjust to new technology, to new techniques and new scenarios. And these systems really have a more adaptive and general learning ability than we've seen in our previous research and in earlier industrial applications. For example, robots with Covariant AI can now handle about 95% of the diverse objects being sorted at Austrian warehouse logistics company KNAPP AG. For the future companies are going to need to ramp down older and more costly and cumbersome approaches to machine intelligence and to really ramp up more human inspired approaches like Covariant. We're really seeing no single path to this transition, though the right first step is to begin with some experimentation and learning. But this radically human turn in intelligence, in part, will be enabled by a turn to less data hungry AI, which can complement well-established approaches.

Now let's take a look at data, the D in our IDEAS framework, and the veracious data appetite of deep learning requires massive computing infrastructure, and this increasingly puts data hungry AI out of the reach of many resource constrained organizations, as well as academic institutions trying to do AI research. Moreover, these systems can break, or even hit limitations in the real world. For example, Starsky Robotics offers a good illustration of the trouble with taking a maximum data approach. The company initially had some very impressive accomplishments here in the United States, introducing the first street legal, self-driving truck in around 2016. Starsky however, ended up closing up shop about four years later. And its founder explained that its machine learning systems were run on huge data models, and these systems didn't work particularly well when dealing with unusual or edge cases that the trucks were encountering out on the roadways, like an unrecognizable piece of debris, or say, an empty bag that was blowing around on the freeway. For the unmanned trucks to handle these kind of, one of a kind situations, they required exceptionally large and accurate and labeled data sets of novel edge cases resulting

in a classic case of diminishing returns for Starsky. In the future, however, we're going to have top-down systems that don't require as much data and are faster and more flexible and more affordable, and we're already seeing some really good early examples of these more human inspired data efficient systems today.

Let's look at an example that Paul already mentioned, the United States National Football League, which uses what are called few shot learning algorithms, and few shot learning tools offer an effective option for when the NFL needs to quickly search through its videos football games to find a few relevant and exciting plays for its highlight reels and for other promotional content.

Additionally, when robots have a more conceptual understanding of the world, as humans do, it's easier for them, it's easier actually for us to teach them things using a lot less data. For instance, the AI firm Vicarious has developed robotic arms that get better at sorting items as they go along, as they do the sorting. And these smarter robots have already been put to work assembling product sampler packs for the makeup company, Sephora, which has to deliver a huge number of combinations of fast changing SKUs and boxes and different types of sample packs. So that AI system, which is actually modeled on the human cortex, has lowered the cost of this massive combinatorial problem by about 80%.

Mastering the use of big and small data to generate value from AI requires organizations to lay a solid foundation. And this means breaking data out of legacy silos so it can be unified in the cloud, across different dimensions, and processed with cutting edge analytical tools. And I'll mention three practices here, and we go into much more detail on these practices in the book. First of all, modern data engineering, where data, even small data sets, can be used for a variety of AI systems and analytical apps. Second, AI assisted data governance, where AI cleanses and classifies and helps secure your data sets. And finally, data democratization,

where non-technical business colleagues can quickly access the right data sets to innovate and make better decisions. And companies that get this right, we see, really enjoy substantial business benefits in that they're no longer dominated by data but are actually driving it to ever more powerful and fine grained uses.

Okay. So let's talk a bit about human expertise, which is the E in our IDEAS framework, and the radically human turn in intelligence systems is upending many of our assumptions about the role of people and human expertise and, one of the most consequential human turns that we're seeing is a shift from machine learning to machine teaching. And more precisely, it's a shift from machines learning by processing mountains of data, to humans actually teaching machines based on their professional expertise, and even their human perception abilities and their human intuition. And people are increasingly guiding intelligence systems with top down human knowledge, imparting natural intelligence to what was previously artificial. And at the same time, we're seeing a number of the big tech players like Microsoft and Amazon and Google, they're each developing platforms that allow people to teach machines using simple and domain specific interfaces, that don't necessarily require a background in coding or in data science.

And we're beginning to see a wide range of industry, examples of machine teaching, from software development to cleaner energy, to electric vehicle maintenance. At Royal Dutch Shell, for example, an engineer or other in-house expert can use a machine teaching application to show an AI drilling system how to adapt to changing underground conditions on the fly, and this human expertise, which is layered on top of that smart drill, dramatically improves the operational and sustainability performance of this process. Or, in another sector, Etsy, which is the online marketplace for vintage and handmade goods, has used machine teaching to develop a product recommendation system based on fashion style aesthetics, which is a notoriously difficult

challenge for artificial intelligence, but this challenge has been addressed by having the company's experts actually school the system in subjective notions of style, and human senses of style. So the recommendation and classification algorithms now have a more human-like sense of styles from the art world, such as art nouveau, and art deco, and it can discern the emotional style of a painting or a photograph, whether it's fun or humorous or inspirational. And it also spots the lifestyle that's expressed in a decorative object, such as whether it's boho or farmhouse. In another example, Tesla's autopilot AI algorithms learn from the hundreds of thousands of owners that tacitly teach its autopilot feature how humans drive in virtually any situation, which is an AI approach called human behavior cloning.

To get the greatest value out of both systems and knowledge workers, organizations will really need to reimagine the way that specialists, as well as non-specialists, interact with machines. And you can begin by giving your domain experts a working knowledge of AI, so they can efficiently transfer their expertise to company processes and company technologies, so don't hesitate to put humans in the loop to directly impose their innate and acquired human abilities into AI systems.

Okay. So now let's discuss architecture, which is the way that we design individual solutions into whole systems. And because all businesses are now, in effect, technology businesses, architecture matters more than ever. That conventional information technology stack spans software and software applications and hardware and telecommunications and data centers, but this conventional stack simply can't handle today's hyper digital world of mobile computing and AI apps and the internet of things and all those billions of devices, those mobile phones that we use every day, and it certainly wasn't designed to adapt to that human turn in intelligence and data and expertise that is setting the new terms for innovation. So in place of this rigid conventional stack, innovative companies are designing what we call living systems, that is

boundaryless adaptable and radically human architectures that bring in elegant simplicity to human machine interaction.

So, if you look on the consumer side, consider Epic Games, which is the creator of the software framework called Unreal Engine. Unreal Engine is a fast and adaptable architecture, allowing more than 8 million people to simultaneously engage in graphics intensive gameplay, in addition to collecting a steady stream of information for AI enabled analytics in those games. Or on the enterprise side, consider how 10 of the world's most prominent pharmaceutical companies have embarked on a collaborative effort to accelerate drug discovery. The goal here is to use a boundaryless IT architecture to harness the collective knowledge of that consortium, but while protecting the patient data and intellectual property of its members. Architectural techniques here include federated learning through cloud and edge computing, and privacy preserving machine learning, and secure multi-party computation, and differential privacy, and many more architectural techniques. And here, innovation and IT architecture holds great promise for drug development, which of course can take years and cost upwards of billions of dollars in order to bring a new drug to market.

As many of these examples show, technology and business strategy are converging in various layers of the tech stack, but to tackle the most ambitious challenges, and really position the enterprise to be adapted, businesses also must think holistically across layers of the tech stack. And in our research, we see that leading companies begin by flipping where they invest toward core technologies like cloud and data analytics. And they also reimagine their approach to developing apps to empower more humans with data and intelligence, often incorporating industry tailored algorithms from cloud providers into those apps. Instead of employing AI and related as point solutions, we're actually seeing leading companies weaving together radically human developments in intelligence, data expertise and architecture. As a result, they're innovating novel strategies

that are far more than the sum of their technological parts. So with this radically human turn, businesses can make strategy and execution more synchronous, and that gap between strategy formulation and execution begins to disappear as human input, especially human teaching, forms and informs strategy in real time.

And among these strategies, three really stand out that we detail in our book: Forever Beta, minimum viable idea or MVI, and Co-lab. And we see Forever Beta strategies in products like Tesla, and these are digitally updateable through cloud networks, allowing customers to see the value and utility of their purchase grow over time, rather than fade away. MVI strategies use one or more elements of the IDEAS framework to precisely target weak links in a traditional industry, provide superior customer experience, and make immediate inroads in a market. So Lemonade, for example, describes itself as a tech company, doing insurance, not as an insurer, doing an app. Using MVI strategies, the company has set out to reduce bureaucracy with chat bots and human customer input to require zero paperwork and instant everything, including rapid claims settlements. Co-lab strategies produce superior results in the sciences or other knowledge intensive environments, through human guided machine-driven discovery. The UK based company, Accentia, is the first firm in history to use AI to develop drug candidates for human clinical trials, and the AI actually mimics human intelligence by design and are trained to interpret images and data in human-like ways to discover molecules that can treat diseases. Also, company scientists are using a new generation of breakthrough techniques called active learning that enable the AI to make predictions on very small sample sizes, like a human might.

Okay so, embracing technology integrated strategy really requires two, somewhat contradictory postures. Forethought and speed. Technology investments must be sequenced logically and carefully, yet it's never been truer for an executive that she who hesitates is lost. So clearly the task is going to be to move

forward with all deliberate speed, but to do so in a way that really differentiates your company, your brand and your offerings in a radically human way. And to talk more about this, I'm going to move the discussion back over to my co-author Paul. Paul, back over to you.

Paul Daugherty:
Thanks, Jim. That was just really clear and powerful description of IDEAS and those five key areas and those really do present the roadmap that you can follow as a leader, as an organization, or as an individual to navigate to this radically human era. And as Jim just said, there's four dimensions that we write about in this part one of our book, actually, focus on everything Jim just talked about and part two gets into these four key dimensions that really are differentiators in terms of how companies approach this new era. So I'll just talk about these pretty quickly and then we'll get onto the dialogue. So let me walk through each of the four. So go to the next slide. The four areas are talent, trust, experiences and sustainability, and let me just drill and into each one and say a few words about it.

So on talent, the point is that, the real way that you scale the impact of ideas and everything Jim talked about and get the radically human impact is by focusing on your talent, and the key things to focus on, and we talked a lot about the book are, first of all, democratizing access to text. You're spreading out those that can use technology. If every company is becoming a technology company, which Jim said, and which is what we believe, then every employee needs to be equipped to use technology. And we talk a good bit about that in the book and how to do that through democratizing access to technology. The second point is how do you become a talent creator? Because we are going to be short on technology skills for a long time to come. There's already the war for talent, the great resignation, all these different dynamics in the talent marketplace and those companies that can create the right talent, you can hire in, train people to do the right things and be the talent creator, not just a consumer of talent from the

market, we believe will be positioned more strongly for the future. And then it's also about improving the KPIs and learning architectures and the culture of learning and rewarding it that are really essential to guide your company into the future. So those are some of the concepts we talk about.

One interesting example, and that gets relates to the metaverse a little bit, is something we've been doing in our company in Accenture, which is we built a learning and onboarding metaverse, we call it One Accenture Park. You can use a laptop or phone, but many people use 3D immersive goggles for the experience, and it's a way to go and onboard and meet people from around the world in the company, meet people who have common roles and such and learn, in what is a provably more effective way. The neuro side shows that the retention rates are about 33% more effective in the 3D immersive environments in this form of training. And we'll onboard 150,000 employees. We're hiring, a lot of people will onboard in this year, 150,000 people using that kind of immersive experience. That's, again, an example of using technology in different ways to enhance talent and bring people together in different ways, creating that radically human potential.

If you move on to the next slide, I'll go into trust a bit. In this era that we're moving into, we're creating more human experiences. Workers need to have more trust in the technology and the way they're using it, consumers need more trust as we create these experiences, or you need more trust to be able to create the experiences and get the access to the data and such that'll be required. So one of our most basic human instincts is trust, and developing the foundation of trust is something we outline in the book as well, and how to do that. And we believe there's a five part framework to pursue that's based on humanity, kind of the human-centric characteristics, fairness, transparency, privacy, and security, and each of those five components contribute to your ability to gain trust. It also ties into the strategy points Jim talked about. For example, Lemonade, which is the startup

insurance company, their whole foundation is about creating a more trusting model, a business model around how they deal with consumers. So their bias, unlike a lot of companies, when a policy holder submits a claim in Lemonade, their bias is to trust the claim and engage with the consumer in a very different way. And it builds a different kind of relationship and dialogue, and their processes and culture are adopted accordingly, a whole different kind of model for processing insurance claims in that kind of way, based on, again, highly trusted frameworks and models.

Another one, if you go to the next slide is a different, technology in a different way. This is showing an example of, from the Museum of Art and Photography in Bangalore, India, and the artist you see in the middle of the screen, you're looking at a museum. The article that you see, or the image you're seeing in the middle of the screen is the artist, M.F. Husain, who's passed away over a decade ago, but has been recreated here to guide the way through his own artwork that's being presented in the museum. And again, to the point of trust, there's a lot of suspicion of recreated digital personas, deep fakes are something that can be used for a lot of harm. This is an example of using the technology in a trusted way. That's been done with the estate and with the relatives of Husain to create a kind of a living ongoing enduring experience, where he's sharing his art and his views with people visiting the museum. Again, a very powerful demonstration of how to flip trust from an area that generates a lot of concern into a highly trusted, very human experience regard.

You go to the next slide, this gets into the whole area of experience itself, which I just talked about a little bit, and how experiences differentiate how you approach technology as you develop it. If you go to the next slide, there's four types of experiences that we focus on, in talking in the group about how, different types of experiences you can create. Empowering experiences, such as what Evinced is doing, which is a startup helping companies deal with people with disabilities more effectively, in terms

of their access to technologies. So there's empowering experiences. Rewarding experiences in terms of fostering different types of experiences that people want to engage in. An example here that I think is very powerful, Strava, the fitness company in the way that they engage with athletes, and it's something that people want to do, and that's tied to the passion of what you're doing is highly rewarding. Tuned in experiences, as experiences that are really wired into the way that people are living their lifestyle. My personal recent example is I got an Eight Sleep mattress a few months ago to help with sleep patterns. It's a smart mattress in this sense which has ability to cooling, detects heart rate and all sorts of things. And it's continuously giving you little nudges and things on how to give you information and data and helping you, giving you experience to help you sleep more effectively. So a great example of a really tuned in experience, very wired into how you're living and operating. And then finally responsible experiences, and this is about using the information in a more responsible way to engender the trust of consumers, and a good example of this is Inrupt. I-N-R-U-P-T, which is a startup by Tim Berners-Lee, who also founded the worldwide web 30 years ago. And Tim's startup is focused on responsible use of data and opt in data models, different ways to view use of data on the internet that's creating more responsible for trust. Tie the experience idea together with the trust that I talked about in the prior point.

So as our experiences, the ways to think about shaping experiences, I'm going to skip this, if you go to the next slide, just to, in the interest of getting to questions quickly. Sustainability is the other topic here. And sometimes people are surprised that we put that in here with all the other topics we're talking about, but the reality is that all of what we're talking about radically human comes together. One of the most human issues of all, which is the sustainability of the planet itself that we live in, and one of the things we talked a lot about in the book is, on the one hand, the ways technology can be the solution to sustainability problems, and actually, if you go to

the next slide, I'll just show you a couple examples. FarmGrow, which is established by the Rainforest Alliance, the Green Foundation focused on a supply chain solution to promote and enable more sustainable farming in countries. You see example here from cocoa bean farming industry, as an example. And technology being applied to help, in this case, small plot owners and growers, connect organic products throughout the supply chain more effectively. Very powerful example, or Virtual Singapore is shown on the screen here, which is digital twin models to create much more effective, sustainable, livable cities, and also energy friendly environments, all through digital twin environments, combined with real human input, real human data, to guide the decision making.

So that's all using technology from an opportunity perspective. On the right hand side, we see Green AI, and the reason this is important is that, all the technology kind of if left unchecked, consumes a lot more energy. For example, it's projected that technology emissions left unchecked could go from roughly, I think it's about 5% or 6% of global emissions today to 14% in 10 to 15 years, which would be highly problematic or catastrophic in terms of impact on overall emissions, if technology emissions grow that much. But the good news is that if by applying green software techniques, Green AI and other technologies, in the right way, you can actually drive more green solutions and reduce carbon impact, improve the sustainability of the solutions we're developing, and there has not yet been enough focus on that within the technology industry. So one of the things we've been involved with is founding something called the Green Software Foundation, which is focused on promoting green development practices so that we lead the carbon impact in the right direction toward green IT rather than the wrong direction, which is more kind of red carbons consuming technology. So these are all the topics we talk about why sustainability needs to be a core part of that roadmap that you develop as you look to the radically human future.

So go to the next slide. Just a little bit of a wrap up on sustainability. This is the top of the mind for billions of people, obviously, which is why it's really was compelling to really think about this in the radically human context. So next slide just shows you those four points, and again, these are, it's the focus of a lot of the work we've done in Radically Human, and the companies, as you apply the IDEAS framework, the way that you think about these four issues again, is what I think will set apart a lot of the leaders as we look to the next era of application of radically human technology.

Okay. So move to the next slide. That's part two. If I just bring together what Jim and I both have talked to you about, we covered a lot of ground, and really just wrap it up by talking about three truths and really the opportunity that we have. First of all, I think the truths are all companies are technology companies. Technology is impacting every part of every business, as I talked about with the five forces up front. This requires really a new approach to innovation and success. That's what the IDEAS framework is and that's what we've laid out in Radically Human, the new strategy approaches Jim talked about, and that is leading us to a radically human era, which I think is very exciting, allowing us to address more, this opportunity for more human potential, more human opportunity in the way we work, live, play, and do everything we do. And I'd say, one of the things Jim and I have talked a lot about, we hit on a little bit is, and I think the opportunity for companies is that, in a lot of cases, companies aren't achieving what they wanted to achieve through technology. If you look at productivity growth that hasn't been what it could be in the last decade. I think part of that is that we haven't been radical enough in how we've applied technology to solve some of these problems and I think part of what we're laying out in Radically Human is a case for being more radical in the use of technology to drive these more human benefits in human opportunity that we see going forward, which can lead to greater success as we go.

So if you move on to the next slide, just flip on

one more. Jim talked about the IDEAS frameworks. You've heard about that, the core foundation of what we're talking about, Radically Human. So flipping the assumptions that you have around these areas again is, we think the path to success. And I'll just wrap up by just showing you the book again on the final slide. And you can order it today. I'd encourage you to take a read. I'd encourage you to let us know your feedback. There's been a lot of great comments flowing through. We're seeing some of the comments come in and with that, I think we'll go to the questions and get into the dialogue.

Sally Ashworth:
Oh, thank you very, very much, Paul. This is a great presentation and really helpful wrap up there. I'm trying to bring some of these questions together. I mean, it would be great to, maybe you could just discuss more about the definition, the radically human phrase and why this phrase matters.

Jim Wilson:
Yeah. So Paul was teeing it up really well there at the end. So, by radically human, and we didn't give a formal definition in the presentation, but by the phrase "radically human" we're actually talking about technologies and strategies that are rooted in human capabilities but are also revolutionary. So both rooted and revolutionary. And we get into some of the details in that in the book. Let me unpack this a bit today, though. So by rooted in human capabilities, we mean that it's inspired by an engineer based on the human brain and human emotions and human social abilities and so on. So, examples of this that we're seeing already in wide use in many enterprises are natural language processing technologies or neuromorphic chips and brain inspired computing. Privacy preserving machine learning. And just to pick up that thread that Paul was just mentioning there, revolutionary. Right? That's the second part. It's really important.

By revolutionary, we mean that we're not interested in incremental designs and uses of technology. These, we're not talking about just

kind of so-so technologies, what are sometimes called so-so technologies, that simply replace an existing work task with an algorithm, but don't actually enhance productivity. So we're talking about technology and work designs that create new value, and more productive tasks for people and for machines and, as the economic research shows, as our own research shows, these more revolutionary technologies are actually the ones that enhance overall productivity, and societal prosperity and new job creation. So these technologies that we're talking about are actually good for humanity in a sense, and good for workers as well, Sally. Yep.

Sally Ashworth:
Okay. Thanks very much. Another question we're seeing is that the metaverse. We've been hearing so much about the metaverse over the past six months. How much does that fit into your view of radically human technology?

Paul Daugherty:
I think I'll take that one as a start. I think it's, I think it fits in a big way, in terms of how we see the future unfolding and unfolding even today, as you think about the example I mentioned with our metaverse for the onboarding we do. I think the metaverse, I do believe will be the shaping force around the evolution of digital application of digital business and processes to what organizations do over the decades. So it's going to be a big impact, but it's not about everybody wearing headsets every day in a future of ready player one type of interaction. It's about how do we mix it and use virtual experiences to enhance the real experiences we have and do it more effectively and efficiently.

That's why we talk about the idea of a metaverse continuum, which is how do we blend these experiences together so you can go from an augmented worker, I used an augmented work example earlier, an augmented worker on doing plants inspection, can have the headset on inspecting equipment on the one hand, but also, so he is impacting the real world in that sense, but also using digital twin models to model simulate future performance, and be in the real

world interacting and doing the other things they need to do at that point as well. So it's about blending the real and the virtual, it's blending 2D and 3D because from an inclusivity perspective, not everybody will have 3D holographic headsets and such or immersive headsets. So allowing mobile 2D and laptop based experiences and blending that into the way you design the metaverse is super critical from an inclusive perspective.

And the nature of the new capabilities, there's a lot of debate around Web3, but the Web3 capabilities that are being created around distributed ledger capabilities, and then some of the collaboration and shared virtual spaces and VR immersive capabilities enabled through an open internet are transformative and that will create an internet and a web that's more powerful than what we have today, and offers a tremendous potential. So it is the force that'll shape the next decade and, I believe it'll, like everything else we're talking about, it will impact every part of what you do. I mean, I wouldn't have predicted that our employee onboarding experience would be the first place we'd use metaverse, but it turned out to be hugely beneficial, and in a similar way, as every company looks at digital extensions through NFTs and such of their real products, I think we're going to see some new surprising business models in a real transformation as we go forward.

Jim Wilson:
If we come back, if you come back to the definition for, of radically human, again, talking about that rooted sense, I think people see and they experience, and they imagine the world in three dimensions. Though, I think most of our digital experiences up to now have been kind of interacting with the 2D screen. So I think one of the most radical things about the metaverse, especially the virtual reality aspect, at least as I see it, is that it aims to shift experiences in a direction that are more natural for people, more aligned with how they already... More rooted in how they actually experience things.

Sally Ashworth:
Thank you. Moving on to, I mean, we've not got that much time left, so maybe the last question, but it's core this idea of trust, and this has come up a lot in the chatting. It's mentioned both the ideas of data governance, privacy, how can companies build trust and why is trust a bigger part of the way companies adopt new technology maybe in the past three to five years?

Jim Wilson:
Should I start that one Paul, or?

Paul Daugherty:
Yeah, Go ahead, Jim. That was good job. You go first.

Jim Wilson:
Okay. So yeah, let me begin just with a quick data point. Nearly three quarters of the leading companies that we surveyed are really focused and investing and trying to differentiate based on trust in areas like cloud security and transparency and fairness and privacy. But software and machines also need to be informed by human behavior, and that was one of the cool things that we discovered when we were doing the research for the book. They really need, as you're designing a system, you need to think in terms of humanity as well, if we're going to trust a new technology. So let me give you a concrete example there of what I mean by humanity, and we talk about this in the book. So Nvidia, which is a company out here in the Bay area in California, is developing self-driving car systems that actually learn by emulating human behavior, which drivers actually find more trustworthy. So for other drivers out on the road would prefer to see a machine that's been trained, and acts more like a human on the road than a perfect machine navigating the roadways, and Nvidia's also been incorporating explainable AI into that system so that the system can show which human behavior it's actually learning from, that self-driving car is learning from. So there's also that point around humanity for us was really an intriguing one as we were doing this research and, Paul, I'll move that one over to you, for the-

Paul Daugherty:
Yeah. I think that is a good answer. And I just wanted to tie it into one of the questions I was looking at the chat also from Padma, who's talking about inclusive AI and such, and those are important issues around trust also, is in the idea of kind of responsibility and responsible AI. We talk about responsible metaverse as we do work on the metaverse in the early stages, and thinking about those principles and in, Padma's point was around AI to be inclusive and include marginalized groups and considerations and data around marginalized groups to be, to journey trust, and I completely agree, and we've done a lot of work around fairness of AI and such from that perspective. And that's part of it too. Do you have the right groups involved in designing the things you're doing? So do you have inclusive groups involved that you're generating the right results in creating trust among the different groups that you need to with the products and solutions you're developing? I think that's a real critical issue. We talked about that a good bit in the book, and we talked about that a lot in Human + Machine when we focused on AI specifically. So I think that's a good add-on to that trust comment.

Sally Ashworth:
Brilliant. I will wrap it up just by a question around machine teaching. It's nice to get specific about industries. Are there certain jobs or industries where machine teaching is most useful today?

Jim Wilson:
Paul and I did an HBR article about a month ago that was based on the book, and the title of the article was that "Robots Need Us More Than We Need Them", and I think that's really a key point with machine teaching. They, robots or AI systems often need us to teach them what we would do, especially when there isn't a lot of high quality data or reliable data out there. So one example that we talk about in the book, a European company, Siemens. Siemens engineers have been using machine teaching approach is to really instruct their AI systems how gas turbine systems can run more

efficiently, and that data's really hard to get within the gas turbine. Otherwise, the system would literally have to run for a century to produce enough useful data to build that model. But at Siemens, we're seeing that those engineers are actually teaching the AI system using their engineering knowledge, and a lot of examples like that, but it's usually in those cases where there just is not good data available.

Sally Ashworth:
That is great. Okay. I am going to have to wrap it up here and just thank you both of you for, all of this has been terrific. I will also share the HBR article you referred to Jim in the follow-up email, along with a link to the recording of this session. Thank you very much, everyone for joining us. And thanks again, Paul and Jim. Cheers.

Jim Wilson:
Thank you, Sally.

Paul Daugherty:
Thank you, Sally.

Sally Ashworth:
Bye-bye.

Paul Daugherty:
Thanks all for attending.