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Automation and Robots—Is your Workforce Ready?

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As the world become more and more closely connected, with many kinds of electronic communications, it will become increasingly useful to view all the people and computers on our planet as part of a single global supermind.

Increasing use of robotics, artificial intelligence, and cognitive technologies in the workplace are giving rise to what we are calling superjobs. Superjobs combine the work and responsibilities for multiple, traditional jobs, using technology to both augment and broaden the scope of the work performed and take advantage of both the specialized technical and domain skills, as well as those skills that are most human. Our guest today expands that idea from an individual level to a collective level in his book Superminds. He is Thomas Malone. He is the director of the MIT Center for Collective Intelligence and he is professor at the Sloan School of Management at MIT. Later, he will be joined by my colleagues, Jim Guszcza, Jeff Schwartz, and Chris Havrilla, who will discuss the practical implications of AI for organizations and for teams, particularly in terms of the human experience at work.

Jim Guszcza (Jim): Hello everybody. Thank you for tuning in to our Capital H podcast. My name is Jim Guszcza. I am the US chief data scientist for Deloitte Consulting. And today I have the pleasure of speaking with professor Thomas Malone of the Sloan School of Management at the Massachusetts Institute of Technology (MIT). Tom is the Patrick J. McGovern Professor of Management at the Sloan School. He is also professor of IT, and he is also professor of work and organizational studies. And Tom is the director of the MIT Center for Collective Intelligence, which is something very that close to what we'll be talking about today. Tom is known to many people as the author of the seminal 2004 book The Future of Work, a topic that's on everybody's mind right now. He is also known as a pioneering researcher in the field of collective intelligence. He is also the author of a new book called Superminds, which is what we are going to be talking about today. So, Tom, welcome to the podcast.

Thomas Malone (Tom): Thank you. It's a pleasure to be here.

Jim: So, I'd like to build up to a discussion about artificial intelligence, the future of work, and the kind of future relationship between humans and machines or humans and computers in the workplace. But let's build up to there. Artificial intelligence is on everybody's lips right now. You are a pioneer in the field of collective intelligence. So, the word intelligence is common to both of these phrases. Can you first tell us what you mean by intelligence?

Tom: Yeah, so intelligence is one of those words that's very hard to define. Lots and lots of people have had different definitions of it, and I often try to avoid defining it when I can, but if you push me to give a definition, I'd probably start with something very general like intelligence is the ability to accomplish goals. So, that can be interpreted in many ways. I think one important distinction that you can make fairly quickly and that turns out to be useful in understanding a lot of what's going on with artificial intelligence today is a distinction between two kinds of intelligence. The first is what you might call specialized intelligence, the ability to achieve specific goals in specific situations. And the second is general intelligence, the ability to achieve a wide range of goals in a wide range of situations.

Jim: So, Tom, that distinction between specialized intelligence and general intelligence is very pertinent to the current discussions around artificial intelligence. So, could you say a few more words about the types of intelligence that are characteristic of machines versus humans?

Tom: Absolutely, that was just where I was headed. One thing that I think a lot of people don't realize is that even the most advanced computers today have only specialized intelligence. For instance, the IBM Watson program that beat the best human players of the game show Jeopardy!. That program even couldn't even play tic-tac-toe, much less chess. So, it was a very specialized kind of intelligence just for playing the game show Jeopardy!. And if you have a self-driving car, that car may be very good at keeping itself on the road, in the lane, in the middle of traffic, but it can't begin to pick objects off a shelf in a warehouse and put them in a box. Again, a very specialized kind of intelligence. And the same is true for every AI program you ever heard of, very, very specialized. At the same time, any normal human has far more general intelligence than the most advanced computers in the world. So, even a five-year-old kid can carry on a sensible conversation about a much wider range of topics than the most advanced conversational AI programs today and a kid can operate effectively in complex and unpredictable physical environments in situations that would completely baffle today's best robots.

Jim: And I think that's worth repeating or really amplifying. I mean, I think some people have called what you just said the paradox of AI. It's very easy to think about these headlines stories of computers doing things that humans could never dream of doing, like memorizing the world's information, like IBM Watson, or winning Go like AlphaGo. But the paradox is that it's easy to forget that even small children are able to do things that are just not on the horizon for artificial intelligence. That's a really important thing to keep in mind, right?

Tom: It absolutely is. I think you are referring to Moravec's paradox—

Jim: I am.

Tom: —which says that the things that are easy for computers are hard for people and vice versa. For instance, recognizing your mother is something that has taken many decades of computer science research to learn how to do, but every baby learns that very, very quickly. At the same time, something abstract and what we think of as complicated like playing chess is something that computers can do way better than people.

Jim: Then we can immediately come to a future work implication of what you just said, because often the interactions that produce value for customers or produce effective service involve things that really come naturally to people, that are easy to take for granted. Things like contextual awareness, common sense, empathy, and understanding of context. These are things that are very, very hard for computers to do but come naturally to humans. And so, we talk about should we replace humans with computers or augment them. I think we should keep this in mind.

Tom: Absolutely. I think what you just said is exactly right, and it points up a fact that, once you start thinking about it, is kind of obvious, but surprisingly few people think about it, and that fact is that intelligence is not just a one-dimensional thing. Sometimes we think about it as that. In fact, often we think about it as a one-dimensional thing. You might say people are more intelligent than dogs and dogs are more intelligent than cockroaches. And so it's kind of one dimension and then we are trying to figure out whether computers are somewhere between cockroaches and dogs or between dogs and people or how soon are computers going to be even as smart as people. But the truth is, and this is obvious

as soon as I say it, computers are already way smarter than people at some things. Computers have been way smarter than people at doing arithmetic for over 50 years. Computers recently have become smarter than people at doing chess and things like that. And I think there are going to be more and more things, especially now with the recent progress in machine learning, where computers can recognize certain kinds of patterns, will be able to do that way better than people. So, it's not just a one-dimensional thing, and we get very confused when we think of it that way because if it were and the fact that any human who can play chess can do a whole lot of other things very well. We think that means, well, any computer that can play chess must be able to do a lot of the other things a human who can play chess can do, but of course that's not true.

Jim: That's beautifully stated and actually it's sort of a nice segue way into something else I wanted to ask you about. And so, if I can take a step back a little bit, it seems to me that what you are just saying points to the need to think not about humans being replaced by computers, but of teams composed of humans and computers working in collaboration in some way. If that is correct, I'd like to take a step back just temporarily to some earlier research you did on measuring the intelligence of groups of people. Could you talk a little bit about that?

Tom: Over 10 years ago now, we were saying that if collective intelligence is important, as I believed then and certainly still believe it is, wouldn't it be nice if we could measure it. So, we said, how could we do that? Well, one analogy to measuring intelligence is what happens with intelligence tests for humans, things like IQ tests. And we said, would it be possible to create something like an IQ test for a group. So, it turns out it is, and we did that. We published a paper in 2010 in Science magazine and a number of other colleagues. And what we did was to apply the same statistical techniques that are used in individual intelligence tests, but we applied them to measuring the intelligence of groups. And to find out whether there is, we gave a whole bunch of groups a whole bunch of different tasks, chosen specifically to span a wide range of different kinds of tests. And what we found was that yes indeed there is for groups just as there is for individuals a single statistical factor that predicts how well the group will do on a wide range of very different tasks. We call that collective intelligence because it's the intelligence of a group of people. So, that I think was an interesting result that such a factor even exists, but what many people find more interesting is the things that predict that factor. Before we did the research, we were worried that it might be, yes, there is a statistical factor that predicts the intelligence of a group, but it's really just the average of the individual intelligence of the group members. So, what we found was that the average intelligence of the group members is correlated with the group's collective intelligence, but only moderately so. In other words, just having a bunch of smart people in a group isn't necessarily enough to make a smart group. It also leads to a very obvious question, which is if having smart people in the group isn't enough by itself to make a smart group, what else do you need. And in our research we found three other interesting things that predict the collective intelligence of a group. The first is the average social perceptiveness of the group members. So, we measured social perceptiveness using a test called reading the mind in the eyes. It's a test where you show people pictures of other people's eyes and ask them to guess what emotion a person in the picture is feeling. The second factor we found was that the group's collective intelligence was significantly correlated with the degree to which people essentially distributed conversational terms more evenly. In other words, if one or two people dominated the group's conversation, then the group on average was less collectively intelligence than when people participated more equally. And then the third factor we saw that was correlated with the collective intelligence of a group was the proportion of women in the group. More women was correlated with more intelligent groups. Now, many people find that result very interesting, and it's important to point out that that result was mostly explained statistically by the result about social perceptiveness. In other words, it was known before our work that women on average score higher on this measure of social perceptiveness than men. And so one possible interpretation of our result was that what you need for a group to be collectively intelligent is to have enough people in the group who are high on this social perceptiveness or social intelligence. And if you have that, and it may not matter much whether those people are men or women, but if all you know about a person is the gender, you are a little more likely to get that skill or that ability from a woman than a man. So, that's at least one possible interpretation. I think this is a complex phenomenon, which we still want to understand better, but I think you can, what we found so far has some pretty intriguing implications for how we form groups and teams in our organizations.

Jim: I think that's right. I mean, the research you did seems to imply that because we can measure it, it's in a sense real in a similar sense that individual IQ or individual general intelligence is real. So, we should really take it seriously and study how to promote the collective intelligence of teams in organizations, right?

Tom: Exactly. I think that's a really good way of saying it, that we should take it seriously, and I think it also says that we can actually study it empirically. That is, we don't have to just guess which kinds of groups will be most intelligent, which kinds of groups will be most effective at a wide range of tasks. We can actually do experiments and measure that and see what actually works.

Jim: That's right. And organizations, if they want, they can even start doing things like measuring conversational turn taking and studying that. Or they could actually measure the social perceptive capabilities of people on teams and correlate that with outcomes.

Tom: Absolutely. In fact, one question people sometimes ask is could we make our team smarter by training them in those things. And I think that's a very interesting possibility. We don't know the answer yet, but certainly it seems possible to train people to take turns more in a conversation. It also seems possible that we could train their social perceptiveness, their social intelligence.

Jim: So, getting back to the main theme, you know, this idea of not just focusing on individual intelligence, but collective intelligence, that seems like a natural way to get beyond this sort of impasse that a lot of people have in their own mind about, should we replace people on the job with computers?

Tom: I don't think we really understand why this is, but for some reason people are way focused on using computers to eliminate jobs, instead of using computers to do whatever they can to make the work more effective, and if you are in a company where you care about this, make it more profitable. We need to think much less about people or computers and much more about people and computers, less about how many jobs computers are going to take away from people and more about what people and computers can do together that could never be done before. Let me give you an example of something that I think illustrates what's likely to be the kind of thing that happens. Think about what happened when the printing press was introduced hundreds of years ago. What the printing press could do is copy text much faster and more cheaply than ever before because it essentially replaced the job of the human scribes, the people who used to make their living spending all day long handwriting copies of text like the Bible or other things. So, I think it's kind of obvious that the printing press mostly eliminated all jobs for scribes. There are still a few people who handwrite things, but very, very small numbers. And this technology eliminated scribe jobs to a first approximation. But look at what actually happened with that technology. By dramatically reducing the cost and increasing the speed and convenience of copying text, the printing press created a whole new industries, things like journalism and publishing and so forth. And those industries had dozens and dozens of new kinds of jobs that never even existed before. Not only typesetters and printing press operators, but authors of novels and journalists and editors and newspaper delivery boys, because it wasn't economical to copy the things that were now easy to copy very economically. So, I think that we are likely to see something very similar with information technology.

Jim: So, Tom, the title of your book is Superminds. Can you just define what a supermind is?

Tom: Yes, I define a supermind as a group of individuals acting together in ways that seem intelligent. Now, it turns out just about every word in that definition is important, and in the first chapter of the book, I actually break down each word one at a time, but basically individuals are often people, but they can also be other groups themselves or in some situations they can even be animals or machines or whatever. So, a supermind is a group of individuals acting, that needs to take some action instead of just think silently with nothing visible to the outside world, acting together. The individuals, if they are all operating independently don't constitute what I call a supermind, but if they have some interactions, if they are acting together in some way, they can then be a supermind. They don't, by the way, have to be all agreeing on the same goal. In fact, I think a very good and very common example of a supermind is a market, where in a certain sense all the buyers and sellers have different goals, but by interacting through the market, they're joint actions lead to intelligent allocations of resources and creation of products and services. So, they have to act together in ways that seem intelligent. So, people often are a little taken aback by the word seem there, but I think it's actually a very important word. Intelligence, like beauty, is in the eye of the beholder. For me to think you are acting intelligently, I have to have some idea of what goals you are trying to achieve. And in some sense, I have to impute to you some goals I think you are trying to achieve or I think you ought to be trying to achieve or that I at least want to evaluate you with respect to. So, that's the sort of quick unpacking of the definition of a supermind.

Jim: And just to maybe resolve one potential unclarity. A supermind is not like, it's not super as in superman, like a great mind. It's more like super as in superorganism, like something that kind of emerges from a lot of individuals acting and doing their own thing, together they form a kind of intelligence capable of achieving its own higher—level goals.

Tom: Exactly. One other connection here, we talked about collective intelligence, and the definition I gave you for supermind is almost exactly the same as the definition or near as I used for collective intelligence. So, in that sense, I think that a supermind is a shorter, simpler, and I think cooler way of saying a collectively intelligent system, and I think the world is full of these superminds. All the hierarchies we know in our companies and other organizations, all the markets, all the democracies, all the communities, these are all examples of superminds.

Jim: And our challenge is to design systems so that the superminds that emerge through these new combinations of humans and computers working together are achieving goals that we want them to achieve and that are good for our long-term societal sustainability. Is that right?

Tom: Absolutely. So, people often say how do we create a supermind as if they didn't have one already. Every company already is a supermind. So, the challenge is to create smarter superminds, either taking on a supermind that already exists and try to make it smarter or creating a new one, like say Wikipedia, which didn't even exist before the technology made it possible. So, as you said that our challenge is to help create and influence superminds to do things that we humans think are good for them to do. As our world becomes more and more closely connected with many kinds of electronic communication, it will become increasingly useful to view all the people and computers on our planet as part of a single global supermind. And perhaps our future as a species will depend on how well we are able to use our global supermind to make choices that are not just smart, but also wise.

Jim: Oh, that's beautiful. Thank you, Tom. I can't imagine a better note to end on. So I think we will wrap it up there. Tom Malone, thank you so much for joining our podcast. It's been a true pleasure.

Tom: Thank you very much. Pleasure was mine.

We just heard from professor Thomas Malone about the combination of man and machine and how it's stronger than either on their own and is enabling us to do things that we never thought possible. And next, to continue this conversation, I am joined by my colleagues, Jim Guszcza, Jeff Schwartz, and Chris Havrilla, who will join me in a look at the organizational and individual impacts on the use of AI.

David Mallon (David): Welcome back to this week's episode of Capital H. This broad family of technologies, including artificial intelligence, machine learning, robotics, robotic process automation, this continues to expand its foothold in the workforce. In fact, our Deloitte 2019 Human Capital Trends Report found that a vast majority of organizations expect to increase their use of these technologies over the next three years. But how? While some organizations continue to use these technologies to improve existing processes, the true pioneers are radically rethinking the work itself. Opening up the aperture to see how to maximize the value of humans and machines in collaboration, and along the way they're redefining the human experience at work. Joining me today to share their perspectives on this topic are three of my colleagues, Jim Guszcza, chief data scientist with Deloitte Consulting. Welcome Jim.

Jim Guszcza (Jim): Hello.

David: Jeff Schwartz, Deloitte Consulting's future work leader. Nice to have you with us today, Jeff.

Jeff Schwartz (Jeff): Great to be here, David.

David: And lastly, Chris Havrilla, Bersin's vice president and research leader for HR technology strategy. Thanks for coming, Chris.

Chris Havrilla (Chris): It's great to be here.

David: So, let's dive in. Superjobs. What is a superjob? And maybe how does it relate to these technologies, artificial intelligence, otherwise? Let's get started with you, Jeff.

Jeff: Thanks, David. What we've seen over the last couple of years is an evolution of work from jobs to hybrid jobs. And in hybrid jobs, we are combining really left brain skills and right brain skills. We are taking the technical side of what we do and the creative side of what we do and we are combining it. Superjobs, which is really the most interesting, is when we combine left brain and right brain, but we also bring the work that people do and the work that AI and robotics do directly into the fore. And the way we are seeing this play out is in many domains and in many business functions, what might have been two or three different jobs are being integrated into the same job, a superjob. And the reason we can do that is half the work that was done by these three different roles previously is done by some combination of either robotics or RPA or AI, which means that the part of our job that we used to do that was a bit more routine and a bit more mechanical is done by a machine, and it really enables us to combine different capabilities. I'll give one sort of very quick example. Historically, for instance, in HR we've had people who have done recruiting, people who have done onboarding, people who have done team assignments, and people who have done learning and career development. We are imagining the evolution of someone who really is a talent coordinator. And the reason somebody can be a talent coordinator, can do a combination of recruiting, onboarding, team assignments, as well as learning and coaching is that half of that work in many ways will be done by some type of RPA or some type of AI.

David: Jim, I'm going to bring you in here. When I hear superjob the way Jeff describes it, I hear the human able to see the much bigger picture. But how do these technologies make that possible, maybe what are we even talking about. What kind of technologies?

Jim: So, we're talking about artificial intelligence and robotics, it's basically machines that can do things that only humans did yesterday. So, that's actually the common definition of artificial intelligence. That really goes back to the original Dartmouth Conference in 1956 when the field took that name. So an artificial intelligence technology is a computer that can do a task or achieve a goal that before could only be achieved by humans. Now, the tagline is "AI is Back with a Vengeance," but the original meaning of AI was slightly different. Originally people thought that we are going to build machines that are essentially sentient machines. Machines that can replicate all aspects of human cognition and are generally intelligent in a similar way that humans are generally intelligent. In fact, one of the original founders of the field of AI, Marvin Minsky, also collaborated with Stanley Kubrick in the movie 2001 because they all thought that computers like HAL would be here by 2001. Well, that just never panned out. That was an unrealistic expectation. Some

people still think we can get there. Let's just say for the sake of this discussion it's not going to happen in our careers. I don't think it will. But the tagline is back and it means something slightly different. It still means computers that can do things that only humans could do yesterday, but it's narrow intelligence. So we've got individual applications that can often outperform human beings at individual tasks but would be worthless at another task where humans are good at general intelligence. We have common sense. We have understanding of context. We have empathy. We understand humor. We understand wordplay. So, you can train an artificial intelligence translation application to translate documents and it can do that if you've got a lot of big data to feed it. But if someone comes up with a little bit of slang, in a new city or in a new subculture, a human can pick up on that and use common sense to understand what that slang is, but a computer wouldn't. The computer has to wait for many samples of data with that slang before it could maybe, maybe figure out what that slang means. And that's going to be the case for a long time, I think. So, AI applications are very deep, narrow applications that are extremely helpful and as Jeff said can take away some of the tedious tasks of work and also do things that humans simply can't do, like retrieve huge amounts of information. On the other hand, humans have common sense, which certainly we've seen no examples of in artificial intelligence in the last 60 years.

David: Chris, connect the dots here. You've done quite a bit of work on HR technology strategies. Jeff's example was an HR example. How do you see this superjob notion combining the best of human and machine collaboration playing out in HR?

Chris: Absolutely, yeah, I think we have kind of a unique opportunity right now to rethink and reinvent how we work and how work is done. Probably for the first time, maybe finally getting technology to work for us, instead of us working for it or it actually being the work, because for the last 20 or 30 years, the systems and these tools have become our work. We've lost sight of outcomes because we're so kind of bogged down feeding the machine. And I think it's completely ironic when we keep saying, "Oh my gosh, we are going to start working for robots," when actually we've been kind of a slave to the machine for a really long time. But we have this unique opportunity, right, to get away from the transactional or time-consuming work that we do or even avoid, right, maybe we don't have time to cull through tons and tons of data and do all these research and homework, and we could start to look at what we do or don't do that's hugely transactional, repetitive in nature, or maybe this concept of going through tons and tons and tons of data and getting some recommendations and us focusing on the actual outcomes or the relationships or the decisions that need to be made or maybe challenging something because that's the thing that machines don't do. They don't actually have that curiosity. We do, right? So, starting to segment the working and going, okay, what part can be done by the machine, what part can augment what I am doing, and what part should I be doing. And when you start talking about meaning and purpose and being impactful, we can really start to actually get towards that outcome. And it's all about who can do this best, who can do this fastest, where, how do we start to segment this work, and truly reinvent how we work and how work gets done. Because at the end of the day, and I love the description of AI, but I mean at the end of the day, 99% of the systems that we're working on or that are under this broad umbrella, and I'm using my air quotes that you can't see, of artificial intelligence, really at the end of the day, this is all about data and it's all about business rules, regardless of if we teach the machine or if it teaches itself, and then our ability to be a human teacher and figure out what to do with all of this. And so as we start to really think about reinventing work and how we work and how work gets done, we finally have the technology that can actually help us do it.

David: So there's a thread that I think wove through all three of your comments, which sure speaks to the fundamental relationship between the human and the machine. Now, the notion that we use technologies to get work done is not new, I mean, that's essentially part of human evolution as we've used tools, right? But that said, there is a narrative right now out in the world that people and machines are fundamentally competitors. Are people and machines really competing with each other? Is this really a zero sum game? Jim, I'll start with you.

Jim: No, I don't think so. I always go back to Steve Jobs' quote. He said that computers are bicycles for the mind and I think something similar is very true of artificial intelligence. Again, I think sometimes we are slave to our language. So, as I said, the tagline "AI has made a comeback" but it means something different than what it originally meant with the founders of the field. It's really come to mean kind of different concept, it just sounds a lot clunkier. It's human-computer symbiosis. That goes back to almost the same time. But that's really what we have right now. We've achieved the ability with big data, big computing power, digital technologies, the cloud, and so on, to create all sorts of technologies that can work with us together as symbiose or as members of a team in ways where we kind of counterbalance and complement each other's relative strengths and weaknesses. Going back to the comment just now about the fact that this is all based on business rules or on big data, well, those are very rigid things. No set of rules can encompass all the and all the surprises, and the contextual bits in everyday human interactions crucial to business. And with AI built-in big data, for example, facial recognition technologies, there are serious regulatory risk management and ethical issues involved in building and deploying those things if you do it kind of blindly without humans in the loop, both to build the technologies and also deploy them and kind of monitor them going forward. If you build a self-driving car in Palo Alto, it won't perform so well in Pondicherry. If you train a deep-learning algorithm to recognize human faces or human voices in, say, Iceland, it might not work so well in Indonesia. So, you got to be very careful about that. You need to pay attention to the sampling brain, but there is very much

an issue of like if you don't deploy this right and monitor it right and have humans involved for the handoff when the machine doesn't do so well and we will have edge cases, then you get into trouble. Or a more humble example would be in a cost center situation. For certain simple transactional things, chatbots are going to keep improving and yeah chatbots will be more efficient and maybe even nicer to deal with than the human for certain kinds of transactions over the phone. But you want to be able to sense when the customer or the caller is becoming frustrated so that a human can jump in with their empathy and common sense and humor and so on and so on. So, really it's a story about complements and not substitutes.

Jeff: I think it is very helpful to use this to think about some of the paradoxes here, and one of the things I think we should be very direct about and one of the things we are discussing with clients around the world is as we are implementing and introducing and integrating AI and robotics and cognitive assistance, it is not necessarily about computers and technology taking our jobs, but it is about how all of our jobs are going to change as we continue to work with new technologies, new AI, new cognitive assistance. And I think this is where it gets very interesting for us as humans, as people who are actually doing work. The real focus that we are seeing now as we are integrating AI and robotics into companies is really asking two fundamental questions. The first is what work are we trying to get done and as we implement new technologies, how does that increase throughput, how does that lower error rates. We know that those things are possible, but we are also asking the question, what are the things that teams of people and machines can do more of and differently. As one of our colleagues John Hagel discusses, what are the unforeseen problems? What are the new solutions that we can create with peoples and teams working together with machines? The other side of it is, and we talked about this in one of the trends that we put up this year. David, I know we started by talking about superjobs. Another trend we highlighted was learning in the flow of life. Learning and work are highly integrated. Ongoing learning is going to be part of every job; if it's not already, it certainly will going forward. And learning is a uniquely human skill, and interestingly, it's a very important part of the work process. And going forward valuing the time that employees spend on learning as individuals and teams is going to become, we think, one of the metrics and one of the KPIs for high-performing organizations, which is great. More machines, more learning, more value created by the people on the team.

David: Practically speaking then, what would you suggest an organization should do? What should an individual listening to this talk this week do to prepare for this, to take full advantage of this?

Jeff: I think what business leaders are doing, and this includes line business leaders, tech business leaders, HR business leaders, what we're doing is redesigning and redefining jobs and work, right. Redesigning it around AI and people, redesigning it around different talent models. We haven't really focused today on the gig economy and the crowd and the freelancers, but doing that in the context of what's the aim for redesigning work, what's the goal in redesigning work. One of the things we have been talking about and writing about is we think there are three things that you can do, three objectives that you can reach when you redesign work. You can focus on cost and efficiency, which is traditionally where we go first. It's very important, but as we know from the strategy work that we and others have done, cost is only one source of differentiation in a business strategy. We can focus on value, value to customers, the ability to create new solutions, the ability to create new products, and we can focus on meaning, meaning for the workforce and meaning for the customers and meaning for the community. So, not to lose the thread here, but we need to redesign work and jobs around AI and people, around different ways of working with a clear view on what we are trying to achieve for cost, value, and meaning. For individuals, it means recognizing that the world in which we live, whether you are an 18-year-old or a 28-year-old or a 58-year-old, which is little bit closer to where I am in the world, all of us are in a world where constant learning and constant reskilling and what sometimes I would call multiskilling needs to be part of what we are thinking about. The idea that you can skill yourselves and you can be once and done in your life, in your career, is an outmoded model. It's an outmoded way of thinking about how you are going to work, how you are going to grow in your work. So, as an individual, I think it's something that we have been talking about. Tom Friedman has said it when we have interviewed him as well. You need to be a life-long learner and we need to be building both in our personal lives, on the job, and institutionally, meaning education institutions that help reinforce that as well.

Jim: Here's one example that might be useful. I have been involved in this, and a lot of other people have been involved in building predictive algorithms that help child support enforcement officers in different states that have prioritized their workload. It actually changes the job. I mean, a lot of times child support enforcement officers are doing reactive work. If a custodial parent calls and says, "Hey, I am not collecting my benefits. Can you come and cajole the noncustodial parent to pay up." But what if you had a crystal ball or just like what if you have a little assistant that could just do a lot of hard work and prioritize all these cases, from most risky to least risky, from most likely to fall behind versus least risky to fall behind. Well, if you had that little assistant to do that for you, that kind of frees you up to do something different.

Now you can actually proactively reach out to people ahead of time, before the bad thing happens. Because a lot of people fall behind, you know, they just fall behind. Bad things happen. Maybe they need a little bit of coaching. And so now maybe the child support enforcement officer's job is a little bit away from being enforcement towards coaching, towards prevention, towards behavioral nudges, and that's a kind of life-long learning. You need to learn how to work with the algorithm and learn to know when to override it or not to override it.That's one kind of learning. But there is another kind of more human learning, you have create a new form of meaning. That's kind of a satisfying type of learning, and in my experience the people who have been given these algorithms are quite happy with it.

Chris: I love that we are talking about the learning side of it, because I do think that is a fundamental mindset shift of being in a constant learning mode as opposed to, I have built all this stuff and now I am an expert and I don't have to do that anymore. And from a more like just practical standpoint, okay, what should we be learning. And I think that's the biggest shift that people need to start to make and thinking about how do we work with machines, how do we rethink work, how do we reinvent all of this, you know, we are figuring out how our assistants can help us in doing the work that we need to do, and then that's half the battle, right. Sometimes just knowing what work has to be actually done. But I think the other side of this in terms of skills and being really practical, I think data literacy is huge for everybody.

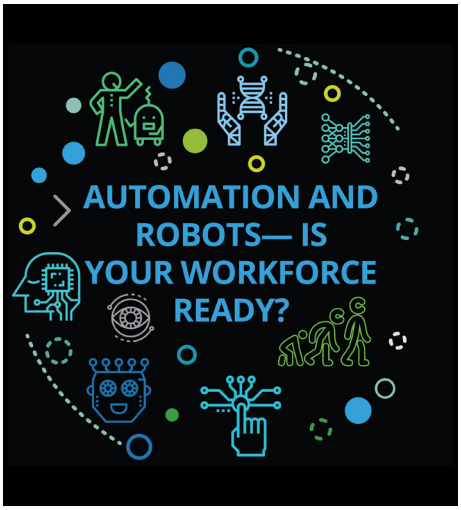
Jeff: I think the arc of this conversation today has been very interesting. As David started us thinking about the zero sum game, the competition between machines and humans, and we've evolved the discussion. It has actually evolved quite nicely in the few minutes we have been talking. Obviously part of this is about tasks and costs and efficiency, but another part of it is about value and meaning and solving new problems and unseen problems. That's really where value is created. It's a creation process. And then moving beyond a sort of work efficiency discussion to where we've been talking in the last few minutes about the integration of learning and work, the role of curiosity, the role of relationships, the role of thinking outside the box, which I am sure we'll come up with a machine that can think outside the box, but one of the things that people are pretty good at is that, as Jim was saying earlier, we understand context. We can be nonlinear. We can make different kinds of jumps than machines can make. And whether it's problem-solving, creation, relationships, but what I really like is the idea that we can do more of the things that we can do uniquely as humans, individuals, and human teams by teaming with technology and the idea of the technology is going to be on the team and it's going to play new role.

David: We've talked about robots, relationships, curiosities, tell us what's next. Why is this urgent? Why is this important for organizations going forward?

Jim: I think it's urgent because we really need to get beyond this narrative of machines replacing people. If we pursue that narrative, and I've a lot of people express that desire to do cost take out and replace jobs with machines, we are going to, it will be a very big missed opportunity. It will be, societally it will be a very bad thing. We don't want to live in a world where we are working for machines. And it will just simply create a lot of confusion, a lot of mixed expectations. On the other hand, if we can do what Jeff and Chris were saying, if you can figure out new ways of creating value-adding ways in which humans and machines can work together, we are going create a better society. We'll create more efficiencies, we'll create more meaningful work, we'll create more humanized work, we'll create more satisfied customers, more prosperous citizens, and so on. And on this topic of curiosity and learning, that really is an inherent human trait and I think we've got the seed for a future podcast on growth mindsets, which is used a lot in education. We are beginning to hear about growth mindset companies. And I think what Jeff was saying about life-long learning and making that part of the goals and the KPIs of organizations, I think that's a very important thing to stay on top of.

David: Thanks for that and thank you very much to all three of my guests today, Jim, Jeff, and Chris. Very much appreciate your time today. And to those of you out there listening to us, thank you as well. That's it for this week's episode of Capital H.

We thank our guest, professor Thomas Malone, for his insights into collective intelligence and superminds, and my Deloitte colleagues, Jim Guszcza, Jeff Schwartz, and Chris Havrilla, for helping us understand AI in the context of work today and where it might take us in the future, as we delve into more topics and trends that focus on putting humans at the center of work.



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