TECHTalks | EPISODE 3 | BUILDING TRUST IN PHYSICAL ROBOTICS
With Mark Cotteleer, Managing Director, Deloitte Consulting LLP and Physical Robotics Domain Executive Sponsor and Kathleen Felter, Manager, Deloitte Consulting LLP and Physical Robotics Domain Lead

Raquel Buscaino: When it comes to technology, the conversation has been mostly focused on software, the bits and bytes that we've grown so familiar with over the years. But what happens when that software is complemented with new forms and functions of hardware, namely, robotics?

Welcome to Deloitte TECH Talks. I'm your host, Raquel Buscaino, and I'm the emerging technology lead on Deloitte US Novel and Exponential Technologies team. My team senses and make sense of emerging tech. And on today's episode we'll explore the future of robotics, why there's so much activity happening in the space right now, and the impact that robotics will have across businesses and industries.

I'll be speaking with two leaders in Deloitte's Physical robotics practice. Mark Cotteleer and Kathleen Felter.

Mark and Kathleen, it is so great to have you here on the podcast as we kick things off, it would be great to hear a little bit of who you are and what you're doing with robotics? Mark, if you want to start first.

Mark Cotteleer: Sure, my name is Mark Cotteleer and I'm a Managing Director for Deloitte in our GPS, or Government and Public Services practice, where I focus on issues around smart manufacturing, smart operations, and of course supply chain. And I lead our physical robotics new business initiative in which is really about providing strategic oversight and championing the overall effort. It's great to be here.

Raquel Buscaino: Kathleen?

Kathleen Felter: Kathleen Shelter. I am a manager at Deloitte Consulting, and I sit in our new business innovation practice. I provide day to day leadership of our physical robotics practice.

Raquel Buscaino: Wonderful! Mark Kathleen, so great to have you on board here. And for our first question just kick things off easily. And Kathleen, I'll direct this to you. We say we're talking about physical robotics. What does that mean? Can you give us a description or insight into the scope of what we're talking about here?

Kathleen Felter: Absolutely. So when we are thinking about a physical robot, we're thinking of a programmed mechanism of material, so physical material with a degree of autonomy that senses and actuates, so "actuate" meaning moving, manipulating material, positioning itself in response to its current state. So Deloitte's Physical Robotics Practice is designing, manufacturing, and applying those robots.

Mark Cotteleer: So Raquel, I mean just adding to that, I loved your intro because you talked about the integration of digital and physical. And so often, we think of technology in a sort of a digital sense but what we recognize is that we still live in the physical world and it's the application of that digital intelligence into the physical world and empowering these devices to move in response, or to actuate in the physical world, and we're going to see a lot more of them.

Raquel Buscaino: And so do you see that there's finally enough momentum and emerging technology advancement in this area that hardware is kind of taking off, or we can achieve that hardware and that infusion of hardware and software at scale?

Mark Cotteleer: Yes, it is as I would see it, and this is true, by the way, in other dimensions of the physical digital space, things like additive manufacturing or advanced CNCs [Computerized Numerical Control]. It's really about the digital side of the technology has gotten compact enough, and powerful enough, and cheap enough that we now can enable individual units of matter, call that a robot, to make it a robot that moves in response, and the rest of the story follows.

Raquel Buscaino: And then, Kathleen, I mean, how can we begin to break down a rather large concept, such as the intersection between hardware and software into ways that we can easily think about them?

Kathleen Felter: So the classification of robotics is evolving and progressing along with the market. So, to name a few types: autonomous mobile robot, articulated thingy, then you have more advanced humanoids, exoskeletons.

When we got this effort started, we were thinking of those different buckets, and even from that time, Cobots, for example, or collaborative robots, sure that it is a classification. I see the market moving away from collaborative robot as a robot, and more of an application of a robot. So, based on the application, you might need a wheeled robot, you might need a legged robot and so the need and the complexity is a varying degrees based off the application.

Raquel Buscaino: It's a good point, because, yes, you can categorize it on a technical level, but really, what matters is the application area that you're thinking of, because that's what's relevant for businesses.

Mark Cotteleer: And I would add that, we would not go into a situation and say "I want to find a use for articulated robots or for articulated arms", we would go in and say "I need to pick and place small objects, repetitively at a high speed and high precision." Oh! Well, then, maybe we need an articulated arm, or a pick and place machine, or something like that. So it's a very solution forward attitude that we would adopt for physical robotics, but also for pretty much any kind of technology suite that we're that we're bringing to bare.

Raquel Buscaino: I think that makes a ton of sense. Can you speak to why there is so much happening around physical robotics? Why should businesses be talking about this?

Mark Cotteleer: I guess number one, maybe the most obvious to anyone who is trying to hire people in our current environment is widespread talent shortages and in particular talent shortages in areas that robots, physical robots actually happen to do a pretty nice job, that is highly repetitive. For example, in health care, in lots of manufacturing industries, we see lots of demand emerging from the need to augment workers, and I'm choosing that word really carefully, because I think a really important point to be made here is getting across the idea that this is not about replacing people. It's about augmenting their capabilities and letting humans do what they do best, which is adapt, and adjust, and create new knowledge and let robots and other automation do what it does best, which is a lot of stuff really fast, really repetitively.

You combine that then, with coming out of COVID, and including learning some harsh lessons about the brittleness of extended supply chains, we have government incentives in the US and in other countries to re-shore production.

And what that really means is locating production close to demand in the market, which means that production needs to go wherever can in the world. And wherever it needs to go, they're having trouble finding the people to do it. In order for manufacturers to do that, they need to augment human beings. That produces a widespread demand for automation.

Raquel Buscaino: It is that's combination of one, there's a lack of labor available, but also that there's new business models and supply chain models that are emerging that require innovative techniques to address that…

Mark Cotteleer: Yes.

Raquel Buscaino: And then, Kathleen, I know that you've worked on a handful of projects in this space and can speak to some of these application areas. Is this what you're seeing in the market right now, that different companies are using robots because of these labor shortages, because they're trying to make changes to their supply chains. What are some of the examples that you're seeing here in the industry?

Kathleen Felter: I can speak to one of the biggest labor shortages in the healthcare provider market. Just the attrition of health care workers in hospitals, whether that be nurses, CNAs (Certified Nursing Assistants), and the tasks that they are being asked to do on top of the jobs that they were hired for. So think about food delivery, think about

changing sheets, laundry… That's one way that we see autonomous mobile robots being able to take some of the burden off of the worker and have them focus on probably what they're most passionate about doing, which is clinical care and patient care.

Mark Cotteleer: I'll give you one more example: we have a client and they did their own analysis. So they looked at their shop floor workers: 30% of their time spent fetching. Shop floor worker does not add value, per say, when they're going to fetch a component, when they're going to fetch a tool, when they're looking for job instructions, you know, when shop workers add value? When they're making stuff.

And so just in that one space, you see opportunities to use robots to fetch things, to locate them, to pick them up, and to bring them where they're supposed to go.

Raquel Buscaino: I think it's a great example of the augmented piece of this puzzle. It is not an "us versus them" but rather us as human beings with robots, being able to free up time to do higher order pursuits. One of the other questions that I have for you both is: What are the opportunity areas that businesses should be talking about right now? Why businesses should be talking about this right now?

Kathleen Felter: When implementing physical robotics, part of that equation is the human factor, and when I think about a company's readiness to adopt robotics, the workforce and the organizational culture must be ready for it. And so the workforce example specifically is: you can add these autonomous, mobile robots, articulated arms to collaborate with those operators on the shop floor. If they are not: 1) ready for that type of technology, 2) they don't have a robust understanding of that technology and 3) they might be looking for workarounds around that technology, if they can't trust it. Trust is such a huge part to this, then that implementation is not going to be successful, and if they pilot it in one area that is not terms for scaling.

Raquel Buscaino: You mentioned something that I think is really critical here which is this idea of the challenges of implementation, and the key one was trust. I'd like to dive into that a bit more. What are the main issues, the risk considerations that should be top of mind for organizations as they seek to implement robotics?

Mark Cotteleer: Trust is foundational. So the idea of fear of robots and fear of automation, ultimately is a question of trust. Can I trust you with my safety? Can I trust you with the impact on my job? Can I trust you to do your job the right way? So trust is actually a multi-dimensional concept that frankly, Deloitte has spent time exploring more broadly in the marketplace, around things like assurance and risk, and cyber. Can I trust you not to be hacked? So it is a multi-dimensional construct and Deloitte can help in that domain. So, for example, with a major retailer, we are working on trust, to help make sure that the robots are following their protocol, that bad actors can't hack into physical devices and reprogram them in ways that could sabotage production or even harm people.

So trust is, I don't know, Kathleen if you have anything to add to that, but I mean I Just think it is central to the deployment of robotics.

Kathleen Felter: Marc, I agree and another large component of trust, and how businesses might consider thinking about it, is when, we'll use a factory floor as an example, I know we've used that as an example a few times, but a factory floor: You have your day to day operators.
In order to implement robotics, there is the design components for "where are we going to place these robots? How are they going to augment these workers?" And so bringing the operators, the people that are going to be interfacing with this technology day to day through that design process and building consensus and bringing them along for that journey is really important.

Another idea that comes to mind when we talk about trust is the safety component: The regulatory space. Just like with a lot of advancing and innovative technologies, is trying to catch up with the regulations to keep workers safe. So training becomes very important for the people that are interfacing with that technology day to day, so that people feel safe around the technology.

Raquel Buscaino: It is a great point, because, as we move from digital to physical, there is a different degree and kind of risk. Right? Don't get me wrong. Our digital lives are extremely valuable, and I certainly don't want my digital data to be hacked but I definitely don't want to face a robot that's been hacked. So your point about getting consensus, bringing people along the journey is of the utmost importance, and maybe one of the major challenges and considerations that companies should have from the beginning.
There's 2 pieces, right? There's the technology. And then there's the humans. And the goal is "let's have them work together". But on that technology piece. What are the other technologies that are needed to make physical robotics more easily adopted?

Kathleen Felter: It's a great question, and I would almost flip it on its head to say "what technology do robotics not need to interact with on a daily basis?"

You think of the technology and the different systems that humans interact with, most of those carry over to what physical robotics need to do their job effectively.

So, 5G and Edge computing, that's absolutely needed to make timely decisions. Artificial intelligence, similar to humans requiring training to do their job, robots need training to do their job too. So reinforcement learning or all the training when a worker is on-boarded into a new position that is required for robotics as well. And then the IoT, Internet of Things technology that humans and robots work with as well, and then integration into the greater organization's various enterprise systems. If we're working in a warehouse, getting instructions from a warehouse management system. If on a factory floor, if a part needs to be replenished, getting that instruction from the MES is going to be very important. If we are just using humans to press that button to send a robot to go get them something, we're not being proactive in how we're building items on the factory floor.

Raquel Buscaino: That's so interesting because you touched on the technologies that are foundational in a way. But you also honed in on the fact that because we are talking about physical robotics here, we're operating in the physical world, and it's not like software where you toss out earlier versions, and you just hit the upgrade button. You still got physical legacy manufacturing systems and processes, and so how do we work within the existing physical infrastructure that we already have. That's almost more of an important question than when we talk about digital technology.

Mark Cotteleer: I love Kathleen's metaphor. Well. Robots also require an infrastructure. They also require training, as Kathleen pointed out. They also require monitoring of their health and safety. So we need many of the same systems. The interface might be different, and the task you might look slightly different, but ultimately what robots are used to do go back to the definition: robots are used to actuate, to create action in the physical world. That's what they're for, and in that case, they are doing a job that will require human-like systems.

Kathleen Felter: Yeah, Mark, that's a really good point and made me think of what about the technology that is on the robot, in the robot.

Humans: when you have a worker starting on the job, they have 2 eyes to direct them; robots, we have to think of the computer vision systems that need to go on top of those robots. We, the physical robotics practice at Deloitte Consulting, we are exploring and developing this intelligent inspection capability, which is key. We talked about repetitive tasking of robots, so sending that mobile wheeled robot from point A to point B to deliver goods. What about putting a vision payload on top of that robot, so it is also able to look out for is there an object that is in its way, identifying that object, and being able to act, based off of that intelligence.

Raquel Buscaino: I can see how that robots right now, maybe purpose built. "My purpose is to get items off the shelves, where as a human being, we are so multi-dimensional and so maybe that's an area where robots will eventually graduate towards having more functionality that allows them to be multi-purpose rather that purpose-built.

Mark Cotteleer: That is a great characterization of the direction that we're moving, so it's not so much a question anymore "what can a robot do? It's what else can a robot do while it's doing the main task?

Raquel Buscaino: And so, what do you think, as let's say, 5 10 years down the line? What's your hope of the future for how robots and humans are working together? What does that look like to you?

Mark Cotteleer: Kathleen and I were talking earlier today about a question similar to this. 30 years ago that question might have been: how do you envision people working with computers in 20 or 30 years, and the answer is "seamlessly".

I don't know if that's going happen in 5 years but there are domains already, mostly with large organizations where humans and robots are already working kind of seamlessly together. I would foresee that, given the dynamics of the market, increasing computing power to enable increasingly flexible devices that we call robots, applied in increasingly diverse domains, which means both different tasks, as well as lower tiers of the supply chain.

I think that we are fast approaching a point where the demand and the ability to adopt will mean that more and more businesses will be able to use them in more and more applications. And so, for example: If you saw an automated floor sweeper moving by you at the airport, you might find that interesting, but you would hardly find it shocking so already, these things are creeping into our daily life, and we're going to be increasingly surrounded by them.

Raquel Buscaino: Yes, we're already norming to it to a certain extent, it just that the applications areas are going to be far more reaching, the technological advancements will become more powerful and the adoption of these technologies will be more pervasive.

Mark and Kathleen, thank you so much for chatting with us about what's new and what's coming next when it comes to physical robotics and to all our tech savvy listeners out there. Thank you for tuning in until next time stay, Savvy.