Andy Packham: Hello, everyone, and welcome to another Elevate Podcast series. And today we're talking about something actually revolutionary. We're talking about Industry 4.0 and the revolution that we're seeing based on the previous revolutions, how we've seen industry move from farming to development to the factory into development of supply chain, into automation and computation. And now we're seeing a new revolution in the way that we are. We are connected and we're connecting factories, manufacturing together, I mean to automate that and derive a lot more value, not just from the physical but from the data. So, I'm really excited today. I'm joined by Ward Lawrence from Microsoft and Ralf Schulze from HCLTech. So, Schulze and Lawrence, do you want to just quickly introduce yourself?

Ward Lawrence: Sure... Hi, everyone. This is Ward Lawrence. I am senior director of Partner strategy for the manufacturing industry at Microsoft.

Ralph Schulze: Hi there. My name is Ralph Schulze. I work for HCLTech and I'm heading up the industry next initiative on behalf of HCL, which is basically covering the digital transformation, particularly in the manufacturing environment.

Andy Packham: Thank you, Ralph. would really appreciate your time today. You know, this is a very big industry 165 billion. So, we're not talking small numbers. We're talking about things that are changing, not just the factory, but actually society and the way we think about work and the way we engage. So well, why don't you just kick off. Tell us a bit about the transformational drivers. You know, what do you say? What's that wave of disruption that... we're kind of in some respects in the middle of.

Ward Lawrence: Sure. So, the first trend we're seeing is that our customers are asking for help to address the skills gap in manufacturing. It's not really the sexiest of jobs out there, but it is critical to everybody's economies. So, we're trying to help them by making the employees they have more productive. That can be through automated alerts coming from manufacturing systems whenever issues arise or better tools to improve communication. On the shop floor. We're leveraging tools like HoloLens for instructions on how to service machines without requiring hours of training and even employee retention through access to more learning materials and then following on from that same theme of worker shortage. Factories need to become more agile too. We see some industries turning more to automation wherever possible and this requires either a very reliable connection to the cloud or a hybrid approach with edge-based capabilities. And that latter one being the majority of factories. In industries like semiconductor. They're building new factories, and it's much easier to design a greenfield environment with automation in mind. But the vast majority of plants will be retrofitting existing factories. So, the first order of business is ensuring machines have connections to gather the data,

to then be able to improve operations, whether through augmented worker productivity or full automation. Another trend we're seeing is in digital engineering. COVID really showed that engineers also need access to their workstations and software in the cloud. So, it's PLM, CAD and CAE systems all being cloud enabled. It's opening up the desire to introduce more collaboration into the design process. So, simulation in the cloud can save time and money in enabling more agile engineering processes that help get products to manufacturing much faster. It also creates a digital thread, which is becoming more and more important, whether you're talking about large discrete manufacturing companies and automotive and aerospace or even process manufacturing or web based, customized ordering is becoming more prevalent. And then lastly, help with a resilient supply chain is another frequent request from our customers. It's all about unlocking the data that exists across multiple silos. Now, on the positive side, most supply chain data is located in ERP systems. That have fairly well-structured data managed by IT. So, it's a matter of combining a company's data with their overall ecosystem of suppliers and bringing in third party information from logistics providers, weather services, etc., to gain end to end visibility of a supply chain and once that data exists, then you can begin to layer air services on top of it to create a more autonomous supply chain.

Andy Packham: Well thanks, so I think this is so much about the skills and the access rather than just sort of talking about the. you know... I suppose a lot of people think about it as IoT and just a bit of connectivity, but I think the spot on are the trends you're seeing from the customers about skilling and enablement and access to data is really what the what this is all about. Ralph Love to get your views on this as well.

Ralph Schulze: Right. Thank you. So, first of all, Ward some really great points and I just want to not repeat the whole story over and over again, but I would like to elaborate on a couple of things, which I think are you know... caveat to this. So, first of all, on the workforce transformation, I guess one of the things we have to consider is that also the nature of work has greatly changed. So, work from home ever since COVID 19... everybody is well aware of that, but in essence also some other trends are there. So, we used to actually do our interface to the digital way, work mainly through our mobile phones, if any, or our laptops and desktop systems. But what we're seeing right now is that there is a whole bunch of new assets and new devices coming into the workforce and that may be things like smart cabinets, which I need to interact with, that might be things like smart labels, that might be things like autonomous guided vehicles and all of that. So, in essence, the variety of how the workforce interacts with the you know, the wealth of information is actually growing quite exponentially.

And I guess things like our digital workplace offering need to reflect that and need to create that new and be adaptive to that new reality which basically brings me to the point

that, you know, also, you know, there is a lot of emerging technologies which need to get adopted and need to be brought into the range of productivity tools for the workforce in order to guarantee sustainability, agility and repair and resilience. So, I guess that brings me to the next stage, which is. Ward very well mentioned that, you know, factories need to become agile.

Now we see there is two different, you know, directions of where this is coming. The first thing is we are undoubtably living in what we call the VUCA world where VUCA stands for volatility, uncertainty, complexity and ambiguity, and that's the environment we are in. So, in order to respond to that, factories need that extra agility and need that extra security in order to make sure that they can operate wherever the direction, whenever the direction is changing and wherever the strategy comes from. And then at the very same time, also the nature of manufacturing needs to somewhat change. And that is kind of a larger motive, because what we are seeing is that, you know, the market is actually used to come from an area where, you know, this physical product was the outcome of the value creation product, and that was what customers basically consumed. So, they would buy a new car, they would buy a new machine. And that is like the past, because the future is going to look like the value which customers perceive come out of experiences. And these experiences are very well might very well be based on physical product experiences, but they are definitely augmented, if not completely replaced by digital services. It is in addition to that. So that reality also brings us to a world where, you know, we need these factories to become agile much more because the perception of value has also greatly changed. Which brings me to the point that, you know, these operations within the factories and beyond, so in the supply chain and after sales. They need to actually create whole more visibility than they do today. And so, as a matter of fact, the assets which are used in order to create value, to create customer experiences, they really need to get much more productive. And the only way to do this is not to consider them isolated but consider them as being part of what we call the cognitive or data driven ecosystem. And so, the ability to exchange between these assets and to exchange information between these assets and rate their performance based on the evaluation of novel system, that’s where we go to. And that was also putting a lot of pressure on the supply chain or supply network. And there we see the trend of, you know, we used to come from an area where we had visibility, but visibility is really, you know, I can identify some of the upcoming issues and I can make sure that my risk management is avoiding any problem within my supply chain. What's really the next level is what we call the supply chain digital twin. And this is where we close the information. So rather than just taking information, creating actionable insights, we are now closing the gap an automate the resolution process within the supply chain so that visibility is actually basically evolving into a supply chain, into the supply chain digital twin, which is going towards the what we call to... a self-healing supply chain concept, which might be the next step in in supply chain. And then last but not least,

and I already touched upon that is the digital innovation. And that's really what I said before. It's not about the product and it's not about a physical supply chain anymore, but it's an augmented customer experience, build of physical products and digital services.

Andy Packham: Ralph, I love what you said about VUCA and, and the Agile industries. I think that's what it's all about. You know, we are looking at COVID and all of these things suddenly hit us. I don't think, you know, if anybody says they can predict the future, I absolutely don't believe them. So, I think the strategy now is not so much about, you know, a five-year plan, but more of strategy is about agility and how we can take all of that digital twinning and the supply chain visibility to create, you know, an organization that is, you know, integrated up and down straight. None of us sit here on our own to continue to better deliver, to continue to better exist and survive in the wild while VUCA world. So, wait, I mean, like you said, everything is changing... the massive challenges, but, you know, our resources are infinite. So how do we do more with less? What are the challenges you see it.

Ralph Schulze: So, what are the biggest challenges when it comes into factory is that many of our customers have dozens or even hundreds of factories. And so, the biggest challenge they have is to achieve consistency and security. The more factories are on prem or even on edge, it requires a fair amount of effort to standardize and update whenever needed. So, making management a problem on an ongoing basis, being cloud enabled truly helps drive standardization and makes everything much easier to manage. At the same time, you can better introduce secure operations, you know with IoT every device could be considered an attack vector. So having a secure infrastructure is paramount. Microsoft has great tools like defender for IoT... that can help ensure secure factory infrastructure. In engineering many departments have some real problems with an aging workforce. Digitization of notes and processes helps to increase collaboration so that decades of knowledge aren't lost every time an engineer retires. Also, leveraging new Metaverse technology for collaborative design and simulation helps attract younger talent and connect the company's entire workforce around the world. And then in supply chain, often the hardest information to incorporate is a production coming from a company's own factories or their suppliers. Factory info is often unstructured and hard to use. So unplanned downtime in the manufacturing processes to be the most common source of bottlenecks. Microsoft is really trying to help address this unstructured data issue through a combination of our own engineering, as well as third party software vendors, to make it a lot easier for companies to bridge that OT to IT divide and have true end to end visibility from engineering to production to delivery.

Andy Packham: Ralph, I just want to challenge you on something that we've got this where we are talking about industry for, and a lot of organizations are on that journey but

are not there yet. Some even on even at Industry three really. And I've already heard people down talking about industry five is is that something that's real or is it just is it just the tech industry adding another version numbers so we can we can push another upgrade? Or is this something fundamentally different between, you know, kind of where we may be now, Industry four and that industry five step?

Ralph Schulze: So that is such a great question. And I there is a very long answer. A long answer. And the short answer to that. Let me let me start out with the probably starting with the long answer and that is if you take, let's say, industry one, which is basically at birth of the factory and industry two, which is the conveyor belt and the switch from steam engine two or steam energy to or to electrical energy, one thing you will find is that, you know, it took us 167 years to switch from industry one to industry two, basically, and it would actually take half of that time to switch from industry two to industry three and then again half of that time to switch to industry four.

Now what does that mean? Does it mean that, you know, I'm outdated if I'm still on industry three? I guess not as long as my business model and my market environment support, you know, that environment, I guess that's fine. But what we are seeing is that, you know, we are converging into what we call a fluid innovation. And so, Industry five has a point. So, Industry five in fact, is Industry 4.0 aided by two very important factors, which is, you know, sustainability and worker wellbeing, which are both very important points to be added, which were not part of the initial industry 4.0 initiative. But I mentioned that term VUCA earlier on in this podcast and I guess there is a lot of truth to that. So, we will see new technology coming in. We will see new requirements coming in and we will see new disruptive business models coming in on a constant basis. So, do we really want to start counting until we get an infinite number of industrial revolutions, or are we going towards, you know, a fluid influx of these factors? And whenever they create, they create value to my organization, I'm going to adopt on that. So, there was a couple of requirements for this. In order to achieve that, including, you need a digital platform unity, you need a strong cloud service provider. Therefore, I guess we work a lot with Microsoft, and we just create value on top of the cloud services there. But having said that, I guess the idea here is Industry five might be just another step, but the real art is to prepare for this fluid innovation and get ready for whatever comes next.

Andy Packham: Ralph, thank you. I think you're absolutely spot on about how it's kind of less about a version number. and more about how, you know, the organizations must sort of get to this point of fluidity. This continually continued ability to innovate and respond to what is this, this crazy, crazy VUCA world. And without that, I think I think we can have a real challenge by saying, you know, the integration of the supply chain. Nobody can

survive on their own these days. And it doesn't matter kind of how you, you know, protected you are your organization is it only takes a problem in the supply chain upstream and downstream for something really to impact. And I think it's another way that the Microsoft solution set across that is kind of a are encompassing if there are point solutions, it covers how we connect the feeds, how we process updates and really clearly, you know, importantly how we secure those fates supercritical. So, kind of it to wrap up Ward... what have you got any kind of final concluding comments?

Ward Lawrence: Yeah, just first thanks for having me today. And the last thing to add is that as we move into a world of economic uncertainty, finding a way to cut costs is even more important. And building on what Ralph was just talking about, capturing data and leveraging A.I. is the best way to do this. And it doesn't make a difference which industry you're on at this point. Getting that data and using A.I. to find those points in cost cutting is really the way to go.

Andy Packham: Thanks a lot, Ralph. Anything to wrap up here?

Ralph Schulze: Yeah. Well, again Ward... Great point. And value for money. I guess that's the that's the theme of today. So, whatever we can do in order to justify investments in technology when we see value, I guess there's always money available. But that money has to be clearly articulated. And we see that, you know, it's the form of collaboration in the tech industry as well, in order to provide our customers with exactly this value and so I strongly believe in the power of ecosystems, both at our customers as well as with our own operations and in our own tech industry.

Andy Packham: You know, a critical thing to consider. You know, I think we've all got used to just being able to walk down the local store. Everything's there, shelves of all stocks and everything. And we sometimes forget the complexity of manufacturing, that supply chain and everything and just the importance that we put into that ability to be agile and respond now, I mean, what we're doing here is actually very, very important. So, thank you both for your time. Fantastic comments and look forward to more of this. Thank you.