Episode 120: How Robotics and AI Enable the Warehouse of the Future

Marco: [00:00:00] I personally think the future of supply chain is a resilient, sustainable, and self-optimizing ecosystem which anticipates demand, predicts and responds in real time to global disruptions.

Richard: I am Richard Howells, and this is The Future of Supply Chain, a podcast where we discuss hot topics, best practices, and the latest innovations in today's global business. For today's episode, I'm joined by Westernacher's Marco Trottmann to discuss how robotics and AI enable the warehouse of the future. Hi Marco, welcome and happy to have you here today. If you could quickly introduce yourself and your role at Westernacher.

Marco: Yeah. Richard, thanks so much for having me. I'm excited to be here. I am Marco Trottmann . I've spent the last 25 years building highly complex warehouse solutions for companies all across the world. I'm based in Philadelphia right now in the United States. As [00:01:00] you mentioned, I work at Westernacher which is a global SAP partner. I lead our housing practice and our global innovations. And in my role, I mainly focus on building out our business, our innovations. I provide strategic advisory to senior executives and basically try to establish a long-term, trusted relationships with our customers globally.

Richard: Great. I don't think we could have picked a better person to have this conversation with. You've worked in, as you said, worked in implementing warehousing systems for the last 25 years. I'm sure you've seen a lot of change. I'm sure you've seen automation come in. So why is automation so relevant now than in the past? Why now for automation?

Marco: Okay. Yeah. Let's maybe narrow that definition of automation a little bit for purpose of our conversation, because I'm thinking there's process automation, which. Generally more easy to achieve if you have digitalized processes. Yeah, we're talking about [00:02:00] automating physical movements and whether there's physics involved. It's more difficult. Right. And why is that more relevant now? I think there's a combination of market forces noble events and also a commoditization of technology at play together. So. Today's customers demand fast, perfect fulfillment. Yeah. You have this everything now culture and we also see a big shift of business happening online, right? Consumer business shifts to e-com, but also increasingly companies are working through sophisticated connected networks. So that speeds up the pace.

Geopolitics and events like the pandemic also have shown us how fragile our global supply chains actually are and how easy it is to disrupt the flow of goods if just at some point there's a choke point that there's a disruption. Right. And then what I've also seen is in a lot of countries the [00:03:00] labor markets spec specifically also in fulfillment and transportation has been challenging for a long time rising costs, limited supply. So all those things taken together, I think organizations are looking at tackling those complex challenges and naturally they would look at automation because. It can help mitigate labor challenges, right? It can create cost predictability. It can also make existing work safer. We're gonna talk about that maybe later a little bit more in detail. But it's just enabling you to handle that increasing velocity and complexity. And why now? Yeah. I'm thinking the technology has matured for a long time. We've seen a lot of innovation specifically in the last decade as well, and those new solutions are faster to deploy and they're also more affordable for a larger share of companies. So that's why I think right now we see so much attention on automation solutions.

Richard: It sounds like the [00:04:00] perfect storm of increased complexity, increased volumes, more disruptions, labor shortages. It's a perfect storm for automation to come to the forefront. And you mentioned that technology has evolved.

So how has automation evolved over time and which industries have been leading the way and which regions?

Marco: So if we think about, again, physical automation, right? This has been around. In different chips of forms for a very long time. You think about the steam engine created first mechanical capabilities of automobile things. By then, it was always driven, I think, by the changing needs of organizations to optimize their production and delivery capabilities. So for thinking geographically developed nations like Germany and Japan, they have no space to expand, so they early on, invested in those technologies because of the space limitations and of course being developed markets, high labor costs, so they started building up. And then when humans can reach [00:05:00] things we're getting to a limitation quickly. So, naturally classical automation companies, I would say from the last 50, 60 years you will see in Germany and in Japan, and then from industry perspective. I think a early adopter was of course automotive. Henry Forge the T1 model first conveyor belt, right? They they pioneered automation technology to increase manufacturing output. And. That was in 1930. So, that's more than a hundred years ago. I also think retailers have heavily invested in automation technologies specifically also in the past decades because they have a high process complexity. They have a huge variety of

products. So, across all the industries, they deal with bigger challenges. They have high volume orders, they have, now with e-comm, that high volume, but with small frequent orders from customers and customers. And that just creates a complex operational challenge in fulfilling. [00:06:00] So, that leads to investments there. And I think the prime examples we see Walmart, Amazon. I personally think of those actually as supply chain companies with a customer facing business. And if we're thinking about

Richard: changed the way that other companies have had to do run their businesses.

Marco: yes, they force

Richard: supply chain for sure.

Marco: A hundred percent. And if we're thinking about what technologies are we talking here they're much older than most people know. There's conveyor belts out there, right? Everybody knows that. But then we're thinking about topics like automated guided vehicles. Those are large. Think of automated forklifts that drive around on a shop floor or on a warehouse floor and move goods. And the first A GB was invented in the US in the fifties. There's early deployments across the states and Germany in the early sixties. And they were very simple mechanical wire guided in the beginning. But they have [00:07:00] of course evolved through innovation over the years. And then we had those automated hybrid systems coming up around the same time sixties seventies and. They were first just mechanical automation moving heavy pallets around in the eighties. The technology got a boost by first software systems becoming available. So think of Beloit's, Microsoft. He was revolutionizing the space with office and Windows, but also first inventory management systems were developed and the combination of hardware and software really moved that technology forward. And this has matured over the last 20, 30 years. We have seen increasingly sophisticated solutions that handle a variety of use cases. And then what I think is really exciting over the last 10, 15 years, there is a completely new sector that has developed with advanced robotic automation solutions. So that's a completely new technology and there's new [00:08:00] companies that brought this technology to market. And now we have a variety of solutions and use cases they can handle in the market.

Richard: I'd love to talk about some of those use cases. I know we leverage automation to improve productivity to enhance or supplement the existing workforce. But maybe you can talk about some of the different use cases that

you've seen from different industries and some examples or insights of the benefits of integrating automation into the warehouses.

Marco: Oh yeah, for sure. So. If we're thinking about what is the prime target of automation, right? We're having physical movements that are either hard to execute, strenuous unsafe for human workers, and there's also cost factor in empty movements, let's say in a warehouse, if I drive a forklift and I don't move a pallet around, I have sunk cost, right? I just spend money on time, but I'm not [00:09:00] productive. So, automation done right, targets handing over those non-value add tasks, either dangerous, repetitive, strenuous, or just costly and with no value to machines. And then we use human intelligence where it's best applied for the job, right?

Richard: Right.

Marco: So if we're thinking about use cases there's there's one particular project that I've personally been involved in that comes to mind that showcases how significant of impact and the change can be. So, we've been helping a global fashion retailer in implementing autonomous robotics system as was over the course of the pandemic. So think about. If you have a large global fashion business, they have physical retail stores, and then they have the e-commerce business. And due to the supply chain nature of supplying products their clothing to those stores or sending it to a customer when you order [00:10:00] online there's very different requirements in how you, collect, pick, and then ship those out. So, that customer had two different areas in their warehouse. One dedicated to fulfilling store orders and one dedicated to fulfilling the e-commerce orders. Now the global pandemic hit and majority of the stores globally had to close, and then suddenly they were facing the challenge of not having enough stock to fulfill their searching e-commerce business because it was in the wrong area of the warehouse. So they had to move everything over, right? Their floor space was not also adopted to fulfilling that large order of e-commerce. So they faced a huge challenge and with that project with this autonomous mobile robot setup that we've helped them implement think of Kiva systems, everybody think has seen or heard of those Amazon robots that drive around the racks. So that was a similar system. And what we did is [00:11:00] we consolidated the whole stock pool into one big area. So those physical racks, they hold the product and then the robots fulfill both store orders and e-commerce orders dynamically out of this one order pool. That is only possible because you can scale up and down with those robots as demand changes and you can just deploy more robots. There's no physical changes needed. You just need a large floor space where you can put your X and where the robots can drive. And with delivering that project they were fully flexible at the end, and so

they can immediately scale between store and e-commerce orders. However, the demand changes that unlocked, a lot of flexibility for the organization and we did this in record time and especially during the pandemic that really helped them, shift over their capacity. So that was a very telling use case of [00:12:00] how advanced automation and that agility and flexibility helps customers unlock value from investing there.

Richard: It also completely changes the way that they do business in that they probably didn't sell any more product, but the sheer volume of orders that they had to ship and pack.

pack and transport would've been exponentially higher.

Marco: Exactly right. It's the same people that just can't go to a store, but they order online. So the labor shifts into a different area. But with that automation technology they could.

Richard: And they couldn't have done it with just people. They just couldn't have thrown people at the problem, especially during the pandemic.

Marco: no, people couldn't also go to work, but we had all those restrictions. But even now after a pandemic being over, right? We see the benefits of having that flexibility because especially in an e-commerce business, demand changes drastically sometimes with seasons or just with trends.

Richard: Well, it helps companies adapt their business strategies as well. Be confident that if they're going to [00:13:00] move to a more e-commerce business. Or increase the percentage of e-commerce that they can cope with, that change in demand and change in processes.

Marco: Yes.

Richard: We've done amazingly well, not to mention AI so far in this discussion. So I'll be the first to mention it because AI has the potential to transform businesses and especially business processes and I'd like to talk about AI benefits within the warehouse by itself, but also the conjunction of AI and automation and how AI is transforming automation in warehouse operations today. So maybe you can unpack that one a little.

Marco: Yeah, of course. I think I also wanna differentiate initially a little bit between generative AI which is the buzzword right now. We're hearing this everywhere and the general field of AI and machine learning research. So a lot

of the innovations and solutions we see in the automation market today have [00:14:00] actually been driven by this, I don't wanna say classical, but by machine learning automation. This Has been around for a while. It was just not on everybody's mind. And what AI does in this case, is it helps machines make decisions in unspecified situations. So that means we're moving away from static rules to dynamic and adaptive decision making. That's the real value driver. And what I really see at the edge of innovation in automation technology right now AI is pushing the boundaries both in hardware and in software solutions. So let's unpack that a little bit. What does this mean? This machine learning capability has unlocked new capabilities in existing hardware solutions, making them more flexible and autonomous. There's applications of computer vision so that's a subset of machine learning. Which helps machines [00:15:00] sense and navigate their environment autonomously. So if you go back to the AGVs, in the past you had to put a wire on your floor. You have to put visual barcodes or anything that helps the machine find predefined paths with modern sensor technology that has lidar, but then also the machine learning in the background to evaluate the sensor inputs. Those AGVs can autonomously navigate, find their paths through a warehouse workflow, and they can also autonomously go around obstacles. That was a problem in the past. If there's an object, they will just stop and wait for you to remove it. Now they can find their way around and they can also work collaboratively with humans in the same space, in a safe way, which is also very important, right? In the past you fenced off all those areas that are automated, but now we're seeing more applications where they coexist with humans in the same space, and that's a huge [00:16:00] advantage for companies. We're also seeing another application in computer vision, for example, is in manufacturing automation, where computer vision helps visually inspect a product that was built. And can point out to you if there's any deviations from a defined state or a desirable state. And so that technology just helps machines sense their environment and that applied to existing hardware. Just unlock no capabilities. We also have on a much higher level, so this is on a low level hardware execution perspective, but then if we're taking a few steps up on the software layer. If you have many of those machines, robots AGVs, whatever it is, they need orchestration. And that in the past was also driven by static rules. So you say if this, then that. Now the situation changes if you don't have a rule that applies, there's a default rule, but that's not very flexible. So what machine learning has [00:17:00] also unlocked is making. Real time decisions and optimize movements based on rapidly changing inputs. So think about that, that use case of the fashion retailer those robots that were, I don't know an exact number, but I'm saying let's say 2030 robots deployed at the same time and several times per second. The brain of this operation through machine learning was making a decision which robot is the best to execute the next task based on their physical position, based on their battery level, based on the order priority. Yeah. And constantly reevaluating and

also over time learning. From maybe less optimal decisions and improving that's the value of machine learning orchestration. And that's been out there and is at a majority stage right now where you have real solutions that that employ this technology. So, in summary here machines [00:18:00] become more intelligent in their autonomous decision making, and then also through machine learning, they become increasingly better at handling. A larger spectrum of physical objects, and that's also important for automation. You think about we've been moving pallets in the past. Yeah, there's a conveyor belt and removing pallets. Now the most cutting edge robots can sense a physical product. And I'm thinking about a round object. A small object. Yeah. Something that can be squished and they can handle those as well. So that unlocks new new levels of productivity and automation.

Richard: So it's not just for brute force, it can be for delicate operations as well.

Marco: Exactly. Exactly. So, that means really from a very low level to a high level of orchestration. We see smaller use cases of AI machining applied everywhere, but then in combination, they really bring the technology forward.

Richard: I think that word orchestration is going to be the key word for supply chains moving forward. [00:19:00] 'cause you gave the example of individual machines within a warehouse and orchestration across warehouses as well, across manufacturing facilities and making those decisions. So every level, as long as you have the data at that granular level. You can make decisions at a higher and higher level that affect the whole supply chain or orchestrate the whole supply chain. It's really cool. And I love the phrase you used, moving from static rules to dynamic and adaptive decision making. I think I will be using that one myself in the future. I, you've talked about so many different things already and I now wanted to ask you about some of the things for the future.

It's amazing what we can do today. What future developments do you anticipate in the field of AI and automation?

Marco: So I think we're just at the very beginning of understanding what generative I can do for us. That's a hot field right now, but there's really, a base level of understanding, I think there so I want to talk about two, two areas that I see. One is more about [00:20:00] availability and adoption of those solutions by the market the other one is where I see things moving. And I think generally for the automation market in the midterm, what I really see is with those robots we talked about. There are so many new companies out there. There's so many innovative ideas tested and tried in the market. I believe we will see a market

consolidation where larger companies buy up smaller specialized providers and then provide a suite of capabilities, because right now you're dealing with that. Robot, that specific company is best at one task. And then we have another use case. You need another robot that may come from a different supplier. And of course that makes it difficult for customers to decide. So I do see a beginning consolidation already. Companies getting bought up. I also see and that's a very interesting development for me, a commonization of the hardware market. So in the beginning [00:21:00] building those robots was cutting edge manufacturing and companies jumped at building and selling those. Now I'm seeing that some of those early adopters or some of the innovators. They retract a little bit from building the hardware because it becomes commoditized. Those sensors, those motors, all those things become available more cheaply. So the real value actually is in the brain. So the software that drives and orchestrates the hardware. And with that I see that shift of. Companies providing innovative solutions towards the software side. And we've heard this many times, right? Software is eating the world. So it also happens in the warehouse automation space. And then all those advancements I think will really expand the use cases we can handle. So we're packing on more and more use cases that were the domain of humans. And were unlocking those was automation. So for that area, ultimately I see that it will lower the entry barrier. And that's when I think back 25 years when I [00:22:00] started my career to buy an automated solution was a hundred million dollar investment that only the largest corporations could afford. But now with robotics and even business models like robotics as a service, the entry bar is very low. And it makes this technology available for much smaller companies. Yeah, at a lower in initial investment with a fast ROI and also in a shorter timeframe. So I think it'll become imperative to have automation, advanced automation technology, and it'll actually be a competitive disadvantage not to have it in the future. And with that there's another where we focus on the software part, there's another development I would predict. We're still very early in this, but I would see the emergence of a connected ecosystem that will change and expand how automated decision making will work. And what does this mean? [00:23:00] Generative AI and if we're adding Agentic AI, that's the newest buzzword. Now, we'll advance autonomous and intelligent decision making. In a way that it can consider a larger amount of external inputs. And I think you said it very well earlier, we're expanding our context for intelligence across the four walls. So what is truly intelligent decision making? It's not looking at what's going on my warehouse floor and seeing, seeing an obstacle, seeing a problem there and solving it. It's more that you have it's a platform. That considers input signals, events from your customers, from your suppliers, from your carriers, from, news sources, global events, whatever there is. So, I would predict in the future we will see automation just becoming a me tool to execute actions based on those anticipated events. And I have an [00:24:00] example that. I would like to illustrate this to make this a little bit

more tangible. So think about we're still within our four walls of the warehouse and we have that connected ecosystem platform driving our decision. So we're moving product from one location to the other, let's say a more easily accessible location days ahead of anything happening, because we anticipate. A rush order that will come in from one of our customers in two, three days. And why is that? We have through our connected network access to the customer's production schedule. So we know they will need that product and they were domain supplier. But then we also predict based on a signal coming in from our carrier network, that there's a disruption in the supply chain and all shipments of that product coming in. From, from let's say a specific port are held up for [00:25:00] a, for amount of time, so we know there will be a shortage. And so we can proactively inform our customers, say, look, we got stock of this. We can ship it to you within two days. We know your production schedule is at risk and we can act ahead of time. And automation is then just there to make it happen.

Richard: To execute. Yeah,

Marco: Yeah, to execute.

Richard: that's a great example. You've talked about the fact that there are met lots of different robotics provided, and it's consolidating a little bit, but it leads the question of how do you get that to integrate into the business. So what role do you believe, companies like SAP play in supporting Automation. And the second part of the question is, how can Westernacher help businesses realize the full potential of bringing together the robotics, the business systems, and the customers?

Marco: Yeah, I would think especially SAP as a provider of enterprise systems touch a majority share of the global supply chain [00:26:00] transactions. So. I think 98% of all Fortune 500 companies use SAP systems, right? And we're touching a large share of the flow of goods in one way or another through SAP. So, I think with that providing that, that suite of applications. That help run and optimize an automated supply chain is important. We said hardware is becoming a commodity, so it's about the software and the intelligent orchestration. Even today, SAP solution for warehousing, transportation and manufacturing. Yeah. Provide. Or a way to rapidly integrate today's solutions that are out there in the market. So we have predefined interfaces where customers can quickly become productive with those. There's also. Market catering specifically towards SAP customers where you say you have turnkey solutions as ASAP partner helps with those with those projects, of course, but [00:27:00] I'm thinking future. Even those most sophisticated automation

solutions they execute physical movements. So, the brain. We will need to become more intelligent and that needs a single source of truth. And now we're thinking about announcements from Sapphire and everything that we're hearing lately from SAP, it's about data and it's about data being the fuel for intelligent decision making. So I think SAP is uniquely positioned being that provider of the fuel of the decision making intelligence data. For modern AI based automation systems. And also with their position in the global economy, helping the largest two small organizations connect to each other and building that ecosystem. I think they will be one of the cornerstones of that platform, of this connected ecosystem that I was talking about. No.

Richard: And how can Westernacher help companies [00:28:00] achieve that vision that you just mentioned?

Marco: That's an interesting question also because there's a lot of noise. So I think a lot of the conversation I'm personally having and we're having with our customers is filtering through this noise and focusing the conversation on where do I have real value today and how do I take a long term strategic perspective on this? Right? So. We're helping customers building a value-driven roadmap with a really long-term view on where to invest and how to invest. We help them find the best fitting technology that works with their existing solutions in mind and with their software strategy in mind. We advise them to avoid vendor lock in and provide solutions that actually safeguard those investments. It's what I said, right? Today's solution, the best of breed the best robotic application might not be the best in five years or even in three years because the field is moving so fast. So we're trying to help our customers make smart decisions about that and build solutions in a meaningful way so that [00:29:00] later you can switch to new technology without losing a lot of your prior investment. I think that's a key capability and there's not a lot of information out there, reliable information. So we come in here and help. And then most important of all of course, delivering successful projects. Yeah. Every. Software project. Every implementation project needs a strong partner and we bring decades of experience helping customers all across the globe implementing successful projects.

Richard: I think you've proven that over the last half an hour, Marco, in this conversation. I have one final question that I ask all of our guests, so, in a sentence or two, what is the future of supply chain?

Marco: Very interesting question, and I think there's many answers out there. I personally think the future of supply chain is a resilient, sustainable, and self-

optimizing ecosystem which anticipates demand predicts and responds in real [00:30:00] time to global disruptions.

Richard: Wonderful answer. Thank you. Hey, Marco, that was a great conversation. I was scribbling notes all the way through it of some of the topics that you were talking about. So great job.

Marco: Thank you so much for having me here today. I really liked the conversation. I hope it gives listeners, some ideas, right? And of course sparks some conversations.

Richard: Sure. Thank you. That was wonderful. Please mark us as a favorite. You can get regular updates and information about future episodes. We'll be sure to include Marco's contact information and Westernacher's contact information in our show notes. But until next time, from Marco and I, thanks for discussing the future of supply chain.