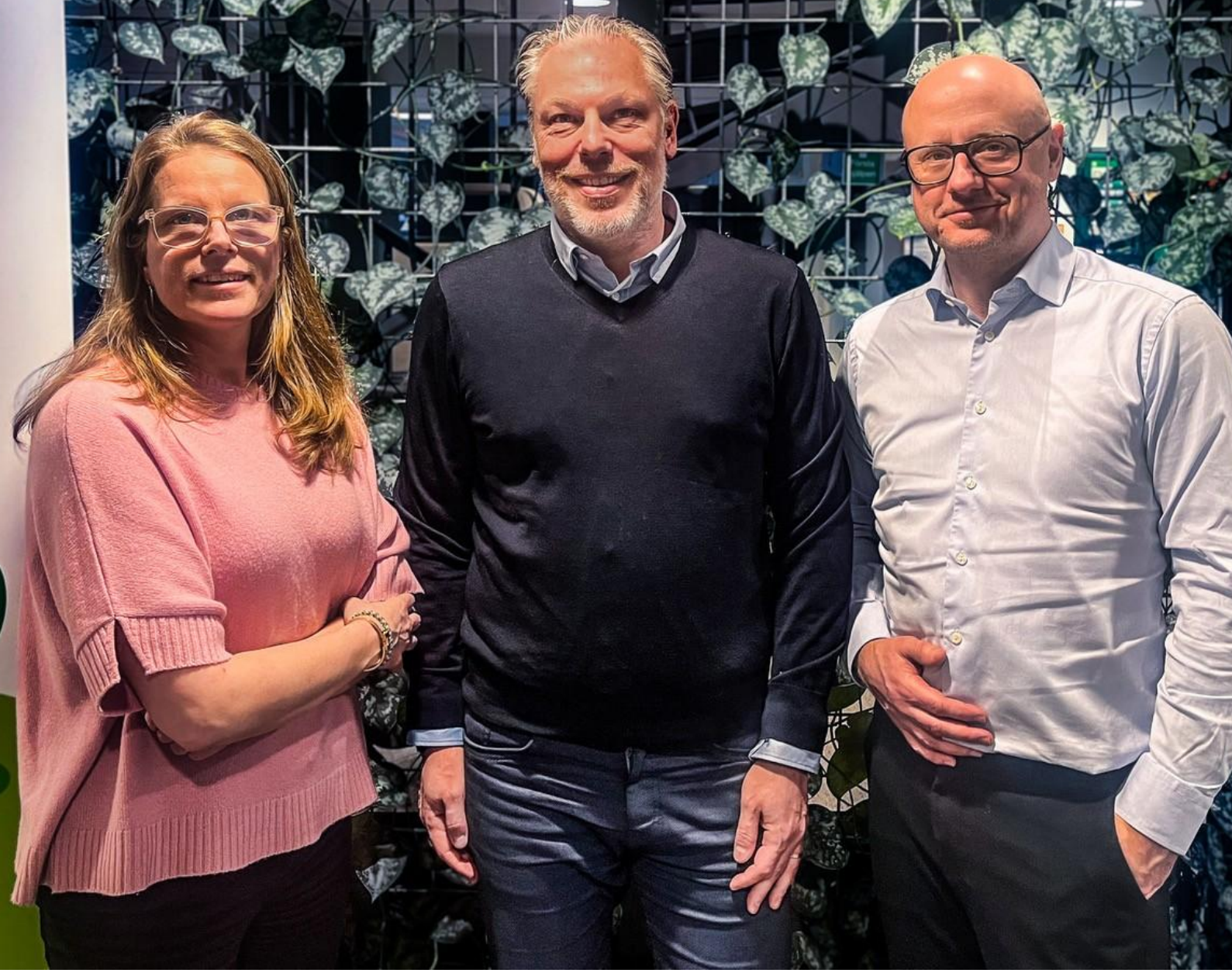

# EP18

*Trends in software development in manufacturing*, with CTO of intelligent manufacturing at Sandvik, Magnus Malmström



# EP18

## *Trends in software development in manufacturing*, with CTO of intelligent manufacturing at Sandvik, Magnus Malmström

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[Guest] **Magnus Malmström**

What we see right now we have never seen in our life before, that we can write code that usually maybe took 3,000 hours and you go down to around 60 hours to do the same type of application. And so, it's changing.

[music]

00:00:18 [Host] **Caroline Segerstéen Runervik**

Welcome to our next episode of Keys to Intelligent Industry. And of course, as usual, I have with me my co-host, Fredrik. How are you today, Fredrik?

[Host] **Fredrik Gunnarsson**

Very well. Thank you, Caroline. Very well.

[Host] **Caroline Segerstéen Runervik**

And you know, we are truly traveling across Nordics. And today we are actually 2 hours north of Stockholm in Gävle. And the sun is also shining outside and there is a lot of snow. And what is fascinated, Fredrik, is that we do see these industry hubs, and that we do have here in Gävle, right? So, we have large pulp and paper manufacturing companies, ERP manufacturing companies, energy players, and then we have a coffee producer.

[Host] **Fredrik Gunnarsson**

Yeah, I guess so, right? Gevalia Coffee, yes.

[Host] **Caroline Segerstéen Runervik**

So at least I will go cross skiing this weekend next to the city. But it seems like you had an accident. What happened?

[Host] **Fredrik Gunnarsson**

Yeah, no, I did ski downhill in the pists a couple of weeks ago when I had a dislocated shoulder when I fell. So, I need to take it a little slowly next week. But it's okay. I'm coming back.

00:01:26 [Host] **Caroline Segerstéen Runervik**

So, it's better to go cross-country?

[Host] **Fredrik Gunnarsson**

Probably, yes.

[Host] **Caroline Segerstéen Runervik**

Absolutely. But anyway, now we're not going to talk with a pulp and paper company. We're actually going to get some more insights into a manufacturing company, which is a very important global company for Sweden, Sandvik. So, with me here today, we have a guest who is CTO at Sandvik Intelligent Manufacturing.

[Guest] **Magnus Malmström**

Yes.

[Host] **Caroline Segerstéen Runervik**

Welcome, Magnus.

[Guest] **Magnus Malmström**

Thank you. Happy to be here.

00:01:56 [Host] **Caroline Segerstéen Runervik**

You have a very long and interesting background, both from sales roles, marketing, and now CTO. You've also been actually working across the globe. I found out Sweden, London, San Francisco, a lot of different places. So, tell us a little bit your own journey. What has taken you to where you are today and why did you make those choices?

[Guest] **Magnus Malmström**

Yeah. Good question. I don't know, to be honest.

[Host] **Caroline Segerstéen Runervik**

Sometimes we don't know. That's true.

[Guest] **Magnus Malmström**

No, but I have always been very curious and worked with, let's say, the latest technology from day one, more or less. And from studying at Umeå University, I worked a lot with mobility in the beginning. And that have taken me

step to step to different technology journeys and different type of companies. And I felt also that it's important to have different type of inputs, which is something I'm proud of today, that I've been in tech, product management, sales, marketing, because it completes me more. And I think I provide more value to Sandvik through that as well today.

[Host] **Caroline Segerstéen Runervik**

And what you actually put yourself is; I'm a contributor of this digital transformation and I believe it all starts with radical transparency. Can you just elaborate a bit on this?

[Guest] **Magnus Malmström**

I believe in transparency. I think people take better decision if they are more inclusive and aware of what data points there is to decide about. Even today with AI, I think democraticizing of data is tremendous and people can get by the fingertip just access to more or less everything. And that's same for an enterprise. The more we can share, of course, be compliant with laws and rules, et cetera, but the more we can share with our employees, the better decisions are being made, I think. So, I'm very, for radical transparency. Then radical maybe is a strong word, and some people can interpret it negatively, but I have that as a thought, and then I respect laws and compliance, of course, and Sandvik culture, which sometimes due to certain legislations, need to protect some data. But in general, I see that that's a good thing to have with us, that we share as much information as possible.

[Host] **Caroline Segerstéen Runervik**

So, what is Sandvik culture? What is it that actually becomes the glue for you and your organization?

[Guest] **Magnus Malmström**

Sandvik culture, of course, have changed also over time, and I've just been here five years in Sandvik. But from day one, they have been very innovative. So, when they created this Bessemer technique, which was formerly SMT, which was one of the business areas of Sandvik today, Aleima, that was very innovative. And then you have mining, very innovative. You have Cormand, which is one of the largest brands in machining, very innovative when it comes to new technology. And we just follow that path of innovation. And so that's very important, I think, culture. But there is a very friendly culture and very customer-focused culture, which I think is a little different from some other large companies at least I work with.

[Host] **Caroline Segerstéen Runervik**

So, a culture that might foster innovation then?

[Guest] **Magnus Malmström**

Yes

[Host] **Caroline Segerstéen Runervik**

Interesting.

[Host] **Fredrik Gunnarsson**

So, Magnus, you're the CTO for Sandvik Intelligent Manufacturing. So, for our listeners to start with, can you briefly describe Sandvik, but more, maybe more specifically, intelligent manufacturing?

00:05:35 [Guest] **Magnus Malmström**

We are here to help basically the machining area to grow the uniqueness of the tools in the era of digitalization. So, we provide CAM softwares, which is the way you provide a tool path for the machines. And one very key ingredient to create a tool path is the tooling knowledge. So, that's very important for us to not only digitalize, but also now in the AI to have recommendations, suggestions, and how to use the tools in the best way. But we also sell our products to globally, to across the world. So, CAM software is a big thing. We have specific CAM software for specific type of machining types or strategies. Then we also have a couple of teams that work with metrology solution for inspections. And that's important in the future for us to sometimes talk about a closed loop. So, you want to detect in the measurement and adjust maybe how you produce the part, et cetera. And then you can start building those closed loops, et cetera. So, everything has a reason for why they are part of Sandvik. And I'm the CTO then for that organization. And my daily work, of course, is to try to help the organization to navigate in the never ending changing world.

[Host] **Fredrik Gunnarsson**

And your typical customer, can you group them into segments or type of production?

[Guest] **Magnus Malmström**

Yeah. So, I mean, first of all, SME customers are the majority of our customers. That could be a small shop of having five machines to 50 machines. That's a typical customer base we have. It's a large market, SME market. But then we also operate to all large companies, aircraft manufacturer, also military defense, of course. And so, we have a certain set of larger customers as well that we work with. But it's a little different way of working. And usually, it is

metal handling. So, it could be Swiss machining or turning or milling or it's different type of operations that our software do and what they want, depending what type of component you produce basically. But it's metal. We have also one product area for sheet metal, which is a little different from the collaboration with the machining because they don't really do tools from sheet metal. It's different manufacturing form.

[Host] **Fredrik Gunnarsson**

And you sell it globally.

[Guest] **Magnus Malmström**

Yes, definitely.

[Host] **Fredrik Gunnarsson**

Any specific segments or regions which are especially interesting for you now?

[Guest] **Magnus Malmström**

US is a very important market for us. Europe, of course, is very important. But it also have changed the last years due to geopolitical reasons. So, maybe before it was a little more movement to Asia, et cetera. Now they're more coming back. And then digitalization or using automation is even more important for us here in Europe and also in the US. But then I think everybody knows that some countries like India will be the third largest economy in 2030, so Asia is an important growth market for us as well.

[Host] **Fredrik Gunnarsson**

So, you provide software to the production lines, and as you say, related to certain production processes. There are larger software players, obviously, in the manufacturers, like the Siemens, Datos. How do you cooperate or find your role in the software landscape? Of the production, in the production.

[Guest] **Magnus Malmström**

It depends if you are in, let's say, the SME world or the small or medium-sized shops, usually, let's say, how they perceive digitalization could be that they have one of the ERP providers you mentioned here from Jahve Lehud Xval Monitor ERP, maybe they have CAM software from Mastercam from us. Maybe they have Metrologic as an inspection software, and maybe they have the office package. That is their digitalization. That's very different than from a larger company that maybe have a very complex MEA system, a PLM system, maybe they have SAP or similar for ERP, and have different production sets and, therefore, the digital thread or how do you connect the products into automation is very important for them, and then we often collaborate with some of these larger players, like if they have this or PLM, as an example, or CAD, but sometimes also competition, but that's the new normal as well, so your friend and foes in the same way.

[Host] **Fredrik Gunnarsson**

But you're also, as I say, specialized in certain steps of the production, which you complement with, right?

[Guest] **Magnus Malmström**

Yes. As we have this quite long knowledge base of machining knowledge in Sandvik, we bring that into the software in a unique way. So that's little also how we different ourselves. Yeah.

[Host] **Fredrik Gunnarsson**

We have talked quite a bit about production and the digitalization of the production area in this podcast. We have had a decade or more of digitalization, step-by-step automation of factories, concepts like Industry 4.0 being launched and implemented, at least to some extent. How do you see the situation of your customers? Where are they in this whole digitalization journey, and what type of dialogues do you get into when you have those conversations with your customers?

00:10:51 [Guest] **Magnus Malmström**

80% of our customers in the next five years want to digitalize much more. They want to increase automation. So, if you think about autonomous cars, they are on the, let's say, the range level 5 or something like that. But then maybe in the beginning, you had a car that we get guidance support, how you will steer the car or whatever. And on that journey, you can see similarities. And most of the shops or the manufacturers are on very low level today. But having said that, when you go to, let's say, the cell or how the machine, when everything is set up, that could be very automated. And they have often a lot of robotics and tools around that brings this automation. But the back-end processes, how to plan, design, that is usually quite disconnected today. So those are the discussions we have, of course, how we can support that, and I'm sure Capgemini and I and similar company have the same discussions, right? So, it's a very exciting time, and I think especially for US and Europe, it is very important to increase the level of cost efficiency, if we put like that, now when more production will move back to Europe or US.

[Host] **Caroline Segerstéen Runervik**

But it's quite interesting because what you're saying and what we partly see is in the front end, if you want to, in the production line, connected to robotics, et cetera, actually you are advanced.

[Guest] **Magnus Malmström**

Yes.

[Host] **Caroline Segerstéen Runervik**

But when it comes to the back end, that falls behind. So how do you sort of make sure now that connection, interaction, and that... interaction starts really accelerate. Because that must be one key part of your role?

[Guest] **Magnus Malmström**

Yeah, absolutely. And many customers, they say to us that we wait until the product company solve this problem. Because before, maybe they had the consultants or people that they took in to try to build certain custom solutions. But that's very costly for them. And I also think that there's a driver today that is stronger than before that they want to have, let's say, good products that works from day one. Before, they were happy to customize and do certain things. That's decreasing. So, it's higher demand for us to be ready to use and very easy to use, et cetera. And also, we take a responsibility to connect our products. So, for the flows that we do, like CAD to spindle or from the machine to the inspection, we are connecting our products. So, you can think about it from, I don't know when, but let's say 10 years ago, the office package was not office package. It was like Excel and Word, and you need to import between the applications. Now it's very seamless. You can more or less copy paste or transfer data. And that's the same what will happen in the industry of manufacturing.

[Host] **Fredrik Gunnarsson**

You talked about the moving back production to Europe and Western countries. That's also, by the way, something we have discussed quite a bit in our podcast before, the re-industrialization. How do you see that trend among your customers?

[Guest] **Magnus Malmström**

I mean, we have evidence of some customers saying that now it was a few years ago, but that now they can compete with low-cost countries, which was not possible before. So, and they further invest in to drive down cost and be more efficient. But then there is also, of course, that the customers think about sustainability. They maybe want to have more local protection because they don't want to be dependent on a, I don't know, 3 weeks boat that could be strapped somewhere in a channel somewhere. So, they, some of the production is maybe more seen to be important, to be closer. So, there are different drivers for that. I think also in some that was low-cost country before also pricing has gone up. But I think there's still one very large issue in the industry is that the upskill or skill to, I mean, we have lived in an era where when I was young, I didn't think about manufacturing because everything was going to be moved to Asia anyhow. Now it's different. But then you need to educate young people that it's nice to work in manufacturing and it's not oil and dirt. It is actually a very clean and very nice environment to work with, and it also pay quite well. People need to, let's say, adjust to that reality.

[Host] **Fredrik Gunnarsson**

Now we have actually studied exactly this trend for a few years now and a report coming of the reindustrialization trend that the next coming actually in a couple of months. And there's a lot of drivers to make that happen. But the competence in people sort of aspect is super important. How do we get an actual workforce competent enough to drive those factories and also being able to manage the complex new environments and technologies in there?

[music]

[Host] **Caroline Segerstéen Runervik**

When you look at your role as CTO, what is your most important tasks to achieve? And then maybe it's interesting to hear a little bit, how much are you thinking about the strategy two, three years ahead? That's even long term today. And how much is it sort of tactics operational?

00:15:55 [Guest] **Magnus Malmström**

We have worked with AI-driven software development for a while, but just these four months have exploded in change. So then, of course, it's culture change, how to use these new tools in the best possible way. Also, to be honest, some people are afraid because maybe they are afraid of the job. Maybe they're afraid of a new way of working. It becomes outside comfort zone. And then we have teams that have using it very well and they are so productive. So, then it becomes a release problem and quality testing problem. So, they create too many features. So, there's so much that they have changed in just a few months. Navigate that with a team of quite a large development team is of course a big task of my job right now. Then we also have launched to all our products, Copilot, which is a prompt-driven user experience of the products. So, you go from an enforced UI where you need to click through a lot of wizards, you could say, to produce a part, and now you can use more prompts to use natural language, or even voice, to that matter, we have in our products. That transition require a lot of focus because the software still need to produce a part with high quality. So, you can't do something wrong. So, it's a lot

about data quality and good user experience and be able to assure that quality. So that's two things. Then of course, we need to invest in the right areas. So that's also part of my job together with the leadership team to decide where we're going to invest. So those maybe are the three topics today on the table, but there are many more, of course, that needs to be managed in a company like Sandvik. But those are three very important areas right now.

[Host] **Caroline Segerstéen Runervik**

And in a way, we spoke about it before we started this recording, right? We are in a real paradigm shift. There's so many things that happened just the last month, which is also questioning both of our companies as software development companies. But I tend to see currently, right now, there is actually a huge demand for what we can help our clients with, right? But I still wanted to go back a bit to this. You have a software house, you could say. And you mentioned it yourself that you have some people in the organization, developers who are really in the forefront, try new things. And then you have another team that might not be there yet. How do you manage that? And how do you also enable them to try what's completely new all the time, because that's connected to security, that's connected to other guardrails, et cetera. Can you elaborate on this?

[Guest] **Magnus Malmström**

Sandvik is a little special company. At least what I see from others is that it's backed up by the leadership of Stefan and others in the top management team. They, Sophie Cervelli is the CDO, they are very progressive and they want to explore new things. So, first of all, that's important, because if you don't have the support from the top management, it is hard to navigate sometimes. So that makes my job a little easier. Then also, I would say that we have chosen a model that we, let's say, run hackathons to test new things, or we have, let's say, all hands meeting where we show from a team that have come very far. So, we work quite a lot with inspiration. So, they can do it, then I would like to do it as well, kind of not so much enforcement of, let's say, rules, more like inspiration. And that works well, I think, for us. Then, of course, there's always some people that don't want to. So, my job is to make sure that they want over time.

[Host] **Caroline Segerstéen Runervik**

And you find the talent.

[Guest] **Magnus Malmström**

Yeah, we find the talent. I think we are a global company. We have development resources in US, Europe, like in France or in Pune in India. So, we have a quite broad, let's say, spectrum of recruitment. And of course, it's easier to find young people in Pune than maybe in the US or in Europe, but we find people. And I would also say that if I compare when I joined just in these five years, it has changed a lot that the manufacturing are perceived more positive. So, many engineers, maybe before, wanted to go to a cool tech company, and now they feel that Sandvik is a stable company, it's a well-run, it's very inclusive. And they can work with the latest technology. And so I think that is in our favor.

00:20:43 [Host] **Caroline Segerstéen Runervik**

I acknowledge that. And then if you look, when you then look at finding competence, see who are most advanced across the globe, do you see some differences?

[Guest] **Magnus Malmström**

First of all, even in this coolest companies now, like OpenAI or whatever it could be, they are driven by a lot of European smart people as well. There's a lot of French mathematics people, there's a lot of Chinese in India as well. So the talent base is global. Then maybe it's easier for us to compete in Pune to find those resources than in Silicon Valley, because then they have more choices. But we are not in Silicon Valley, but that's an example.

[transition sound]

00:21:24 [Host] **Caroline Segerstéen Runervik**

Today in the software development arena, there is this constant debate on, we reduce the number of people because now we have the assets, the tools, so we don't need a software developer any longer. I personally see maybe the opposite, at least short-term. What's your perspective on that?

[Guest] **Magnus Malmström**

I'm not sure I have the final answer because it is changing. But at least for today, the most productive people we have with, if you take Cloud Code platform as an example, they are the most senior developers because they really know how to use the tool in the most efficient way. They also know what they need from the system. They can also validate with competence. So maybe a little challenge I see is that younger people have a problem to come in right now, because why should we recruit new people when we still have not benefited fully from the AI possibilities? But the senior people or mid-level engineers, they are in a very strong position right now because we, and also we have shoes in a strategy that we want more business outcome. Over time, I'm sure we don't have the answer because there will be new roles, there will be new capabilities we need that we don't really know yet. So it's hard to predict now because what we see right now we have never seen in our life before that we can

write code that usually... Maybe it took 3,000 hours and you go down to around 60 hours to do the same type of application. And so it's changing.

[transition sound]

00:23:02 [Host] **Caroline Segerstéen Runervik**

I wanted to double down on this in terms of the new generation. So Erik Brinofsson came just out with his sort of view on this and he is also very concerned that, you know, the students, the young generation coming from university, there is right now a challenge for them to find the new, the first job. But at the same time, those are the really AI native guys, right? So isn't this something which should be a generation for us to just force us to bring on board?

[Guest] **Magnus Malmström**

I have two sons by myself, and they want to be senior position very early, or they want to be a YouTuber or something like that. I think you need to know the business a little more. And I think that will be even more important when you use AI. That if you don't know the, let's say, what you're going to do, then it's a little hard for them. So I think young people also need a little more patience to learn first. And then I understand that there are more opportunities now. They can be entrepreneurs or many different things. It's also an opportunity for them now with AI because you can almost create your own company in a very short time. So there's a lot for them to take in. But in general, I would say that they need to learn. Let's say if you take our business mechanics, you need to know a little more of the depth of physics-based technology you have now with NVIDIA common physical AI, in order to understand that and use that right, you need to also know what you're going to use it for.

[Host] **Caroline Segerstéen Runervik**

So it's two things. One is to really have the basic technology knowledge.

[Guest] **Magnus Malmström**

Yes.

[Host] **Caroline Segerstéen Runervik**

And the other thing which you said was really to understand the business.

[Guest] **Magnus Malmström**

Yes.

[Host] **Caroline Segerstéen Runervik**

And then it's interesting to look at your own background and now being a CTO with your background from actually understanding the business with your background within sales and marketing. How is that helping you in your role as CTO?

[Guest] **Magnus Malmström**

First of all, it helps me to, let's say, validate business requirements or wishes. It helps me to be a good, let's say, supporter for the rest of the management team, which usually are more business-driven people. But it also helps the engineering team to, let's say, translate business values into what we also can achieve from a technical point of view. So, I think that's a strength for me, and I think I'm perceived like that as well, and they welcome me for that experience that I have learned from both from deep technology, but also been close to customers.

[Host] **Caroline Segerstéen Runervik**

And today, what's happening for all of us in the AI domain is really going from... just being a cost play to something which is actually generating revenues for us. And is that then why you see you have the right support from the management team as well, right?

[Guest] **Magnus Malmström**

Yeah, we took an approach from the beginning that we want a lot of customers using our CoPilot. They could have said you must charge for it and they didn't. But then we provided a lot of value to our core products and now we start to monetize on it in different ways. And if they would have been very, let's say, build a business case that aggressively need to bring in revenue immediately, most likely we would haven't learned so much. And we have been very, to say, customer driven in our development, which means that we have improved so much, to say, the copilot experience. And now we start to being valued. And that's a little different if you are usually a hardware company, when you design a hardware product for a long time and then you release. But when we release, we start working with the customers. And then we need to continuously improve every day. And then it becomes very good. And then it's a longer game.

[Host] **Caroline Segerstéen Runervik**

So, you have the customer with you on that development cycle in a very interactive way. How is that working?

[Guest] **Magnus Malmström**

It's great because we have built up, let's say, first of all, analytics capabilities. And when people are prompting with our system, we get very good information. And we can judge from that what we need to improve. So, it's very dynamic environment, very real time. And as we are also using global code, we are very fast to respond to customer demands.

[Host] **Caroline Segerstéen Runervik**

So, it's a very, so the feedback loop is really instant, right?

[Guest] **Magnus Malmström**

Yes, it is instant.

[music]

00:27:33 [Host] **Fredrik Gunnarsson**

We talked about the different regions globally, and if we zoom back into the Nordics and Sweden, Sandvik being a company born and still with headquarters in Sweden, what do you think is important for... Sweden and the Nordic countries to follow this development, which is super fast, both in the production area, but also in software development. What do you think is important for us here locally?

[Guest] **Magnus Malmström**

Yes, there will be big players in China and US that will be very, let's say, advanced in AI technology, but there's no one else that know how to machine dispatch than us. So that knowledge, if we, let's say, AI infuse that or use it in the AI context, then that's our uniqueness. We need to protect that competence. And we know already today that even very, let's say, large companies, advanced even in military defense, they use ChatGPT on the shop floor. But you can't trust that information. It's not reliable information. So, but they still ask for certain questions. And we, you know, this our strategy is to deliver that reliable data through AI. And if we do that well, then I think we will have a very strong position. And then who knows the AI landscape, how it will shift in 10 years. We are see the beginning. This is, even though it's dramatic change, it's maybe the first years of maybe 20, 30 years of rapid development. We don't know the answers. But we do know that we know how to produce a part. And we are the best in the world in that. And if we can bring that out in the right way, then we will help the world. And so that, I think, many of the Swedish or Nordic industrial companies, they have this unique knowledge. And if they digitalize that, if we shall use that word, then they have a strong future as well.

[Host] **Fredrik Gunnarsson**

How do you work here locally with collaboration, innovation, with academia, or how do you foster the development here locally in Sweden?

[Guest] **Magnus Malmström**

Yeah, I mean, we have people across Sweden, so we work with the largest universities, for sure. Having said that, I have not worked much with the Gävles school or university, to be honest.

[Host] **Caroline Segerstéen Runervik**

They might reach out to you now.

[Guest] **Magnus Malmström**

Yeah, it could be other parts of Sandvik, I'm sure, were close with them, but I have not. But now it's super important to be out and listen, and we also have different research projects, et cetera. But then we are a global company, and there are also other hubs like in Germany or US with different initiatives. They also... let's say, advanced technology centers across the world that is close to the industry but closer to university. And some of those are our, let's say, lighthouse customers where our most advanced technology are installed and they can play with that to build new components for advanced materials or whatever it could be for aerospace or similar military defense space, for instance. So that is important.

[Host] **Caroline Segerstéen Runervik**

And which one is the most advanced then? Your most advanced lighthouse now. I'm curious.

[Guest] **Magnus Malmström**

Maybe Nayar, which is in the middle of the US. Maybe they are the most advanced, but it's shifting a little depending on the projects they get. So, we have a quite cool project now in Florida where they producing a new spacecraft, and that's really advanced. So, it's changing. And then we have some that works with human robots. It's a really cool project. So, there's a lot of new innovation goes on, not only in space, but also human robot and also drones. And all those need to be produced and the required components that are shaped by some materials or products or softwares. So, it's really exciting right now, to be honest.

[transition sound]

00:31:23 [Host] **Caroline Segerstéen Runervik**

You are an important leader of your organization, as you said, and you want to foster them to innovate, think new. How do you yourself finding these things that are really, really new? And how much time do you spend on that?

[Guest] **Magnus Malmström**

I have the luxury that we have so many customers, and usually when you're in a position like mine, you often get involved in the most, let's say, advanced cases, because it's maybe more money in those or more exciting for certain areas. So that's a luxury I have, so that I get involved in many of these cases. But then I spend a lot of time, which my wife may don't like sometimes, on research. And that has changed. I mean, before maybe I went to a course or maybe went to a conference, whatever. But today, are you using X, YouTube, the basic stuff, ChatGTP or Gemini?

[Host] **Caroline Segerstéen Runervik**

You're curious.

[Guest] **Magnus Malmström**

Yes, very curious.

[transition sound]

[Host] **Fredrik Gunnarsson**

We talked a lot about the trends now and it's happening things literally month by month or day by day in several of those areas. But if we try to just look three, five, six, seven years ahead, where would you think you would be in the era of intelligent industry, intelligent manufacturing? Five, seven years from now.

00:32:38 [Guest] **Magnus Malmström**

First of all, it has changed just in these five years. When I joined Sandvik, we didn't discuss AI as much at all. I mean, we had some projects and there was more basic ML type of stuff. Now, more or less 90% of my time when it comes to technology is around AI. So that has changed a lot. So, if we look three, five years from now, I don't think that will be a different. We also will see much more usage of AI in our products, in our customers, and build more automation with that. I think that will... in that time period, you say, we will most likely by 2030 start to see much more humanoid robots as well, which will impact the shop floor. And so, we are enabling our products to use voice. And most of these new humanoid robots, like from the Tesla one or Figure, they use voice as well. So, we will start to see that happening more. And we need to find ways to help them to do a job that sometimes humans do today. And that will be a big challenge for us, but also a huge opportunity. Because if we do that well, to bring that knowledge into a human or robot can act on the shop floor, then it will be unique for us and also unique for our customers. But that will happen. It will be a mix. Human will be in the loop and they will verify and they will do a lot of important stuff, but it will be supported by human or robots. And maybe some people believe that will be the next largest industry. So, there's a lot of investments in that area. And I was down in a German customer recently where you can see humans standing and do a very manual job. You can see robots doing, let's say, more automated job. And then you have human robots doing stuff. So, it's already started to happen.

[Host] **Caroline Segerstéen Runervik**

Thank you, Magnus, for a very interesting discussion about intelligent manufacturing. And in a way, I see that you are sitting in one of Sandvik's lighthouses, right?

[Guest] **Magnus Malmström**

Yes.

[Host] **Caroline Segerstéen Runervik**

Driving innovation and really the AI acceleration. And what you mentioned a couple of times is, of course, there is a human in the loop. And we actually do not know how it will look like X number of years ahead. But for us right now, there is an amazing opportunity to be part of this software paradigm shift, if you want to. So, thank you for sharing your role, your perspectives. And finally, also, it's always about the client. It's always about serving the client in the end. And it's also from the client we are learning.

[Guest] **Magnus Malmström**

Yes. Thank you. Thank you for letting me be here.

[Host] **Fredrik Gunnarsson**

Thanks.

[Guest] **Magnus Malmström**

Thank you.

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