EP02

Intelligence from the Recycling Industry with Åsa Fast Berglund

Capgemini

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[00:00:00] [Guest] **Åsa Fast Berglund**

In simulation, you say “shit in, shit out” and, yeah, if you don't have enough data or enough knowledge into the system, then it can't optimize. Even though you have all these advanced algorithms, for example.

[Music]

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

So welcome to our second episode of our pod, Keys to the Intelligent Industry. And of course, with me today I have my co-host Fredrik Gunnarsson. So how are you today, Fredrik?

[00:00:34] [Host] **Fredrik Gunnarsson**

Well, well, thanks Caroline. We're sitting here recording the second episode here in Gothenburg, looking at the harbor, actually. So, it's a very interesting place to be as an industry hub, here in this region. So, real exciting. By the way, Caroline, you have a new role in Capgemini. Congratulations, CEO for Capgemini, Nordics.

[00:00:54] [Host] **Caroline Segerstéen Runervik**

Thank you. Thank you. Yeah, it's a very exciting journey starting and of course, I'm very eager now to do and continue my road trip across the Nordic countries. But of course, coming back to our intelligent industry pod today, we're going to deep dive into two different topics. So, on one hand, automation and digitalization. And on the other hand, recycling. So, with that, I would like to welcome Åsa Fast Berglund. Welcome Åsa.

[Guest] **Åsa Fast Berglund**

Thank you so much.

[Host] **Caroline Segerstéen Runervik**

And Åsa, you have a very long background at PhD, researcher and professor in automation in production systems. And as of today, you are working at Stena Recycling. Can you tell us a bit more about your background and your role?

[00:01:39] [Guest] **Åsa Fast Berglund**

I used to work at Chalmers University as a researcher and also a COO for our test bed in digitalization in three 4.0. Then in 2021, I started at Stena Recycling and now I work at the R&D department as a development portfolio manager within Industry 4.0 and automation. I am Head of the development for this industry and automation development in all our countries. So, we work internationally.

[00:02:17] [Host] **Caroline Segerstéen Runervik**

You have a passion for this topic?

[Guest] **Åsa Fast Berglund**

Yes.

[Host] **Caroline Segerstéen Runervik**

And what is it that, it's so interesting with this topic and what is sort of your driver every day?

[00:02:25] [Guest] **Åsa Fast Berglund**

My driver is to look at automation maybe in a slightly different way. If you talk about automation with people, usually they think about big robots and automated cells and what we wanted to do in our research and also what I do now, is to actually look at automation in a more diverse way. Look at the human's abilities and then strengthen them with technology or technical capabilities. So, for example, you can strengthen the human with exoskeletons to increase the ergonomics, for example. So, you don't always need to invest in robots or robot cells. You can actually do small things with automation that gives high value for the operators or so that was my passion. And now we talk about human-centric automation, and that's also one thing that we have had as our focus for a long time. I'm glad that it's also starting to, to become an in EU and, and also in in industry as a focus area now.

[00:03:36] [Host] **Caroline Segerstéen Runervik**

And you clearly see that you actually can apply what you did study, what you did sort of do research on you, see that you clearly can apply and test your theories and see that it works in practice.

[00:03:48] [Guest] **Åsa Fast Berglund**

Yes. So, so that's actually one, one thing that I wanted to do when I changed jobs to actually apply my research and also to follow a company or the implementation more. I also wanted to be a part of the journey from implementation to roll out to governance.

[00:04:12] [Host] **Fredrik Gunnarsson**

If you go back to your research at the Chalmers, you also wrote the book, the Smart Automation. So real interesting and there you describe in a really good way the process of the production and how to analyze the process and the different dimensions before you actually start the automation journey. And one thing you, you mentioned there is the different types of knowledge, intuitive knowledge, silent knowledge, explicit knowledge. Can you elaborate on that?

[00:04:38] [Guest] **Åsa Fast Berglund**

So, so often when you come to a site or a, a machine line, often the technicians have a, an idea on what, what the operator is doing, maybe doing setups of the machines and handling the machines and so on. But then when we start to dig into what they actually do, they, they do a lot more stuff. They do over 200% more tasks. For example, when they are working, operators and they don't have information or instruction of all these tasks, and they also use a lot of their senses to do the work. So, listen and looking at the machines or looking at the quality and…

[00:05:23] [Host] **Caroline Segerstéen Runervik**

So, it’s intuition in a way…?

[00:05:25] [Guest] **Åsa Fast Berglund**

Yeah, and we call that sensorial automation. And that's quite hard to understand. We have sensors today that, so you can automate it in in some way, but it's also, you need to really look into the experience of the operators in order to catch all these little things, they do every day to optimize the production because we can see things and we can see, they turn it into this speed or these programs, but then they do a lot of small fixes and listen and so on. And that's hard to automate and hard to capture actually. And that's… I think that's interesting to also find these little things that we could feed into the system because if we don't feed it into the system, the system doesn't know. And then, you in simulation you say, "shit in, shit out" and yeah, if you don't have enough data or enough knowledge into the systems, when it can't optimize. Even though you have all these advanced algorithms, for example.

[00:06:36] [Host] **Caroline Segerstéen Runervik**

Would you say this is the most difficult part of the automation to basically to learn?

[00:06:41] [Guest] **Åsa Fast Berglund**

Yeah, like fine tune the process and that was I think that's interesting. So, it's like acting like Sherlock Holmes to look at the small details.

[00:06:56] [Host] **Fredrik Gunnarsson**

And you also just make the distinction between physical and cognitive automation. Can you elaborate on that?

[00:07:01] [Guest] **Åsa Fast Berglund**

Yeah. So, we talk about the physical abilities of the human. So, usually we talk about muscle strength, for example: pick up a package. And then you use your arms and your muscles, and then you can automate that by, as I said, you can use an exoskeleton to live have on you, and then you can lift heavier things and then if it's too heavy or too big you can have a robot arm. And that the different types of physical technology that helps the human to lift this. And that's how we think about automation, so helping the humans. So, what we can do as human, we bring in technology, and the same for the cognitive part. As I said, usually there a lot of more tasks, that are being executed and in order to keep them in track, the order of the tasks and what do and what to look for and so on, you need to have help. So, you don't have as many balls in the air. I don't know if that's the right saying in English… but, ease and the cognitive load of the human. So, that's actually one thing that we have looked into very much. And also, my co-author on the book, Sandra, studying psychology. The combination of psychology to look into the cognitive mind of a human and then the mechanical support or the engineering part. That combination is quite interesting also to have different backgrounds.

[00:08:45] [Host] **Fredrik Gunnarsson**

And in, and in those times where AI data, AI, generative AI is on. The buzz word everywhere on that cognitive and sort of decision making and understanding how, how far can you get with those tools?

[00:08:59] [Guest] **Åsa Fast Berglund**

I think you can get quite far… fast, but there is also with the AI. They also learn from systems. From Google or from data sources. So, they also need a source. If you don't have the self-learning AI, most of the AI that are applied right now is to look at big data sources and then look for different patents and so on. If you have the wrong data source, when you get the wrong answers. So you need to feed a system with knowledge and competence, and that could be a good thing, and it could also be dangerous if you feed it with the wrong information.

[music]

[00:09:48] [Host] **Caroline Segerstéen Runervik**

How do you, in your daily job, spend enough time on looking ahead and understanding, you know, what are the implications or the benefits of the AI? How much are you playing around with this? How are you enabling this in the organization?

[00:10:04] [Guest] **Åsa Fast Berglund**

Since I work at R&D, we need to look ahead. We are spending maybe 20-30% on my daily work to look at new technologies, and how we can use technologies that we already have? How can we sort data and so on. And we also do some proof of concept as well. I think it's important also the collaboration with small companies, and startups that do quite a lot of different interesting things.

[00:10:35] [Host] **Caroline Segerstéen Runervik**

And how much do you work with the academic world today? Because we do see sometimes when we compare to other countries that actually in Sweden, we do not do it enough.

[00:10:45] [Guest] **Åsa Fast Berglund**

Yeah, I agree. I don't think we do it enough, and I think a lot of companies think that the academia is too far ahead and you still have an old interpretation that academia just do like ground theory research. But what we did and what we still do in my department at Chalmers, on my old department, is to work closely with the companies. Using our theories and also together with industry using their data, using the technology that they already have. And I think that's important to understand as a company, you don't need to develop new things. As you said, you already have data, you already have a lot of sensors maybe, or a lot of machines. So, it's maybe more about finding methods on how to sort a data, the how to store the data, how to contextualize the data. So, if more companies understand that we have enough for the industry to make it interesting because that's also one thing for the academia. If we don't have real data or real cases to work with, then we can't develop our methods to fit with the industry.

[00:12:10] [Host] **Caroline Segerstéen Runervik**

I know you had a very strong collaboration with the DNA innovation lab. Of course. What would you say was the real benefit of having this innovation lab and, and what is important to make it successful? What are some of your learnings?

[00:12:26] [Guest] **Åsa Fast Berglund**

When we started an idea of the DNA innovation lab, we built actually a factory, and we thought it was important to actually have like a real factory. So that we actually could do research with the ERP system, with MPS system, with the real PLCs, with a real product, with a real logistics with pick and place and so on. So, we built a drone factory and then when we say, okay, it works here, and then we can scale it maybe into the real industry. And that actually worked, and we also saw that the industry that came to the lab could also take experiments and said, okay, we already have these PLCs, we already have these signals, okay, when we can also do it. It's if you can do it here, then we can also do it. So, that was also a big benefit to actually have a real factories so.

[00:13:21] [Host] **Caroline Segerstéen Runervik**

And of course, Gothenburg is a very good hub.

[00:13:21] [Guest] **Åsa Fast Berglund**

Yes, it is.

[00:13:24] [Host] **Fredrik Gunnarsson**

It's an interesting parallel because there are new factories being established, right, in Sweden, which is a very specific situation building something new. Is it a benefit of building new, is it also problems coming with that? Because you cannot analyze an existing flow, but there's also advantages with the start from scratch approach?

[00:13:42] [Guest] **Åsa Fast Berglund**

Yeah, as you said, I think there are both disadvantages and advantages because, as you said, you don't really know maybe the product and below materials you can do simulation but the experience of having a factory, then you know what to, what works, and what doesn't work. But then of course for an automation in engineer and data science, it's always more fun to have a plane or blank paper to play with. So, of course, greenfield factories are really exciting.

[00:14:20] [Host] **Fredrik Gunnarsson**

When you studied different companies, what do you see, being the most important technology investments and OT/IT digital investments in the companies? What are the key focus areas?

[00:14:33] [Guest] **Åsa Fast Berglund**

I think the focus area is to have a good structure for collecting and storing data, both machine data and business data and warehouse management data, sounds boring, but a good functional ERP system, a good warehouse management system a good ME system. But then you often forget a good OT system to collect the data because often you have like…only using data for monitoring and controlling the machines, and you don't think about, okay, we need to have way to collect this data so we can actually do something with it. So, I think we're good at the business focus systems, and then we forget the more shop floor, near operations and data and how to store that. If you should invest in some more system, it's about how to store and use the operational data that you have.

[00:15:40] [Host] **Caroline Segerstéen Runervik**

But what I hear a lot is, is really securing the basics, right?

[Guest] **Åsa Fast Berglund**

Yeah.

[music]

[Host] **Caroline Segerstéen Runervik**

Very interesting discussion. And we clearly see this as a passion for you. Listening to what you say, I think sort of, you know, maybe the dark factory is actually not going to happen, but that's, that's a separate discussion to have. I think we would like to deep dive a bit into the recycling topic.

[00:16:03] [Host] **Fredrik Gunnarsson**

So, can you describe what happened in the station? Cause you have a number of recycling stations.

[00:16:09] [Guest] **Åsa Fast Berglund**

Yeah. We actually recycle cars and fridges and bridges and everything. So, for us, it, it's quite big products and for the shredders for example, they are very interesting from an automation perspective. Because you load in a whole car and then seconds later you have like small fractions of the car.

[Host] **Fredrik Gunnarsson**

It’s fascinating.

[Guest] **Åsa Fast Berglund**

Yeah, it's very fascinating. You can still, and look, look at that shredder the whole day…

[00:16:42] [Host] **Caroline Segerstéen Runervik**

It happened super quick.

[00:16:43] [Guest] **Åsa Fast Berglund**

Yes, it’s just a few seconds and then you need to sort it in iron, in different fractions. And then the fractions itself, is sorted even more. To copper and brass. And… so it’s a lot of different processes. So, we get really good and high quality fractions, which is quite clean and have a high purity because that is what we want to sell.

[00:17:13] [Host] **Fredrik Gunnarsson**

So as an automation expert and lead for industry 4.0, what are your focus areas in that…in that process?

[00:17:19] [Guest] **Åsa Fast Berglund**

We are actually now focusing on our heavy production as we call it, so the shredders that actually are shredding the cards and washing machines and so on. And also, the more complex processes, that is the last step where we are sort the things that we get from the shredders to more pure fractions. So that does is our focus. And our focus now is to start with the basic, as you said, with to connecting the machines in a secure way, and also how to store the data in a more flexible and scalable way so that we can use it for different purposes because you want to use data in the daily production for planning, but then you also want to use it for energy consumption, for example, or so you want to use the data in different ways. So, you also need to sort the data in order to use it for different purposes.

[00:18:23] [Host] **Caroline Segerstéen Runervik**

I was reading in your annual report that actually you see that the green transition has slowed down and you were commenting specifically on plastic that right now, you see that companies are no longer prioritizing as much recycled material. Do you want to comment on this? And actually, also do you now see then due to the market situation that it's even getting worse?

[00:18:46] [Guest] **Åsa Fast Berglund**

Yeah, we have seen as it slow down. I think also from, not from the companies, but from also we as persons, we are not changing cars as much or we are not buying so much stuff. And for us, we are depending on people changing fridges and cars to do the recycling. So, of course, if people have the cars for five or 10 more years then we don't get as much into the recycling. With that said, I think we are looking very much into becoming an industrial partner, working even closer with Volvo and Electrolux and other customers that actually are both our inbound and outbound customers. So, we get products into the recycling value chain, and then we sell it to them again. So, for us, those kind of customers are really interesting in if we talk about digitalization and automation, the digital thread or to be able to follow a material or product in the supply chain. It's also interesting. So, we also need to build the data and store the data and collect the data in a way that we can follow a product.

[00:20:10] [Host] **Caroline Segerstéen Runervik**

I assume, or we do see that, that today you are able to recycle almost everything of the product. So maybe you also can elaborate a bit about talking about automotive being in Gothenburg. How has this now changed when it comes to recycling a car?

[00:20:26] [Guest] **Åsa Fast Berglund**

Now, when we have a lot of batteries and also referring back to the first episode of software development in cars. It's a lot of more computers and cables and batteries in the cars today. Which of course is harder to recycle for us, if you compared to the old cars with an engine that you can pick out. And then now you need to also sort cables and computers and so on. And of course, we do that as well. So, for us, we get more things to recycle because we can also recycle the cables and the copper in the cable and also the computer. So, but it's also a more complex product because you need to sort it than you need to disassemble it more than you used to.

[00:21:25] [Host] **Fredrik Gunnarsson**

So does it mean that the automation level for you is then going down or you need to improve the automation process at…?

[00:21:31] [Guest] **Åsa Fast Berglund**

Yeah. I need to improve the automation process and also, we need to, when we sort it, we need to also maybe be a more delicate when we sort out the cars and the parts of the cars. Sometimes when the car is, is produced, it's not made for disassembling. So, it's also hard to actually disassemble the car.

[Host] **Caroline Segerstéen Runervik**

So, it's important to influence already that process, I assume.

[Guest] **Åsa Fast Berglund**

Yes. Stena recycling as a whole has a lot of collaborations with the automation industry just to secure the value chain and that you think about recycling and disassembling, for example. Yeah, I think it's important also to look into to that and it's with everything vacuum cleaners, fridges everything, and also for common people when they throw things in the recycling stations. We have a lot of cables, for example, which is quite hard to process, it gets stuck everywhere. It's better with Bluetooth.

[00:22:42] [Host] **Caroline Segerstéen Runervik**

Something we haven't touched so much upon is the competence topic and how do you when work with the competence in regards of both the data automation for the rest of the organization?

[00:22:57] [Guest] **Åsa Fast Berglund**

Yeah, and that's always a big question when you are rolling out new technologies and also new way you're working because it becomes a new way to work when you are collecting data. And so, when you are collecting knowledge from the operators, maybe they need to code certain things in a certain way and so on. And so, we have actually standup meetings every day with sites that we are rolling out technology on just to get the questions and the feedback fast and work quite agile. In that, in that way and the meetings are 10-15 minutes with a production personnel but it's enough in order to just get the questions that they have the day before and see that everything is working or taking up some that it's not working. And then we take it further to our engineers and developers.

[00:23:59] [Host] **Caroline Segerstéen Runervik**

Do you see a challenge on the competence between the people who is working on sort of the floor to say and the other people who's really working with automation? The data, the AI topic…

[00:24:11] [Guest] **Åsa Fast Berglund**

In our business, you need to understand the process. Because the material is so complex and the process is so complex. So even though you, you might have worked with the automation industry and so on, it's more complex and you need to have some experience on the production. We all always have on site visitors for all our engineers, just so that they actually can see the real process. So, they understand, okay, when I do this in the databases, it's actually influences these processes, or it's actually this data or this material that I develop or design these databases for because it's easy to just do databases and then you don't know the relation between the data, but have you seen the flow? And if you have seen the processes, then you can also think about, okay, this signal come from this machine and if we do this and this relation, then we will affect this process or this yield.

[00:25:25] [Host] **Fredrik Gunnarsson**

Do you see clearly how different sort of the KPIs and objectives constantly improve and you see the results in those daily standups or…?

[00:25:32] [Guest] **Åsa Fast Berglund**

Yeah, we see that they start to understand the value of the data. Now we are in the beginning of the rollout, so it's more about the user interface, and we work more backend. So, and that's also one thing that if you talk to data engineers, they work backend with logic and in order to have the role at successful, you also need to work with front end and user interface. But it's always nice to see that when they start to understand the relation between downtime and reruns and the capacity and capability of machines and so on. So, I think it's really interesting to see that they are starting to get the competence or and the value of the data and how to work with the data. So, yeah…

[00:26:32] [Host] **Fredrik Gunnarsson**

Fascinating. And it's something also you touched upon in the book, the user interface or the information in the instructions towards operators. Can you elaborate on the challenges traditionally with that?

[00:26:45] [Guest] **Åsa Fast Berglund**

Yeah, and we have done quite a lot of research how to develop instructions for example, and we have seen that a lot of is picture or picture and text, and we actually had one instruction at one companies that they have a text-based instructions. And then the operator couldn't read. He was too embarrassed to say this to his boss. Of course. And then they wonder why it's always a quality issue on his station. And we looked at what he did, and we said, okay, aren't you supposed to do this? Ah, okay. That's why it's quality issues on my station. And then got like a light bulb moment and we said okay, why haven't anyone told you? And it says here in the instruction, and you don't follow the instruction. Why that? That with the knowledge based or the tested knowledge. And then he actually said, yeah, I can't read, it's embarrassing to say. And thanks to you I will actually talk to my boss. And then he did it, and they actually increased the quality quite a lot after that.

[00:27:58] [Host] **Fredrik Gunnarsson**

And back to the data AI topic, there's now so much, you know, tools available with AR, VR, how are you, are you working with that or…? And what's you experience from your research?

[00:28:09] [Guest] **Åsa Fast Berglund**

We tried quite a lot to work with AR, and we have seen that for remote access and for remote maintenance for example, it worked quite a lot. We have seen also that you need to have glasses because if you do maintenance or if you do things, you need to have both hands available. And usually it's like a "oh, it's so cool, you can have an iPad", and but then you don't have you hands available. So, the practical issue is like, okay, you need to solve that first. And then you start to see like smart glasses and light glasses because okay, you want to have glasses. But then, when we started to look into it, ah, you need to have like a bag with a computer on your back. Because you didn't have Wi-Fi or you didn't have enough power just have the glasses. Okay, then you need to have like a bag with a five kilo computer. Is that… that's not innovation in technology. So, I think it's still quite young.

[music]

[00:29:17] [Host] **Caroline Segerstéen Runervik**

Where do you go and look for who are the most advanced, are the specific industries, specific markets, and how good are we in Sweden? In terms of the automation topic and what we just discussed.

[00:29:32] [Guest] **Åsa Fast Berglund**

We look at the automotive industry is always ahead, and also outside industry because if you look, we have done a study that see how you use digital tools outside in society and then inside the industry. And we saw that the industry is about 20 years after the digital development in society. And young people right now, they are constantly having their mobile phone and their whole life is in the mobile phone. And then when they start to work, they don't even have an email address. They do not have a phone; they don't have anything. And they are so used to the digital lives. So, but I, the automotive industry and then we also look at Meditech. We work quite space industries. So, we work… we have done some cases and also militaries. So, there are some areas that you need to have the information, and you need to secure the quality.

[00:30:37] [Host] **Caroline Segerstéen Runervik**

It's so much more important to actually do the synergies. But learn across industries.

[00:30:43] [Host] **Fredrik Gunnarsson**

We talked about industry 3.0 and 4.0 and now even 5.0. And the European Commission articulated on ambition to focus in industry 5.0 on transition to a sustainable, human-centric and resilient European industry. What's your perspective on that?

[00:31:01] [Guest] **Åsa Fast Berglund**

Finally, I would say! We worked quite a lot with human-centric perspective. We talked a lot about that perspective before, and also the resilience and flexibility, and even more important in the recycling business because as I said, we don't know how our material is behaving or the… what we get in. So, being resilient or flexible and be able to work with new markets or new material, that's the essence for us. So, I think that's important. And of course, sustainability is always important. We needed industry 4.0 and we needed a technology development. And we needed common standards, and protocols for the industry to actually take a step forward. But now, the evolution is more to, as I said, the fine tuning of the technology that we actually have built for 10 years in industry 4.0. How can we actually use, to fine tune this and also take the perspective of the human into, to this.

[00:32:10] [Host] **Fredrik Gunnarsson**

And as a balance to only focus on a dark automated factory. But actually…

[00:32:14] [Guest] **Åsa Fast Berglund**

Yeah, the man and the dog in the dark factory is still a dream. And we will see if we get there. It was in the eighties so, we'll see.

[00:32:24] [Host] **Caroline Segerstéen Runervik**

Looking into the future. Looking 10 years ahead, which we never do today, right? We look like 1-2 years ahead. But where are we then?

[00:32:34] [Guest] **Åsa Fast Berglund**

Yeah, I think as you said, the technology is so rapidly development. If you look at the other industries, industry revolution, it's a hundred year or 50 years between the revolutions and now it's down to 10 years and five years. So, I think it will still happen a lot. I think we need to find ways to use it because now we are developing a lot of different technologies, but we need to think the integration with the mega cities and mega factories. And more of, that is also one thing that will come, I think. Yeah. It's still exciting to and will be, I think…

[00:33:25] [Host] **Caroline Segerstéen Runervik**

It will be in the future, be continuously exciting to work in this domain.

[00:33:26] [Host] **Fredrik Gunnarsson**

What would be your three recommendations for leaders working in automation industry for out there in the companies?

[00:33:35] [Guest] **Åsa Fast Berglund**

I think first one is to have a clearer goal and also to educate the management because, often the operational people knows what they want to do. And then, the managers need to be educated also in industry 4.0, so education of the management and also clear goal. Where do you want to be in… to say five years and then start simple. Start with one machine, one sensor, just to see how if it works, and also to learn and then also build it in resilient or flexible way so you can scale it from one machine to one line, to one factory to many factories. Build with scalability is important as well.

[00:34:26] [Host] **Caroline Segerstéen Runervik**

Thank you and thanks for these very clear advice to all of us. I think they're very important and as you did mention, you do spend quite a significant time of your week in just looking ahead and learning, which is critical for all of us in all our different roles. I thought it was really interesting to hear your perspective on that physical and cognitive automation, and also the fact that you're talking about so much that is part of our sort of intuition or our knowledge that we built up for a long time. And that's a very, very challenging thing to really learn and automate. And thank you also for sharing some really good perspective when it comes to recycling, it's clearly important for us more than ever when you look at where we are today. So, thanks for joining us in our Keys to Intelligent Industry. Thank you Åsa.

[Guest] **Åsa Fast Berglund**

Thank you.

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