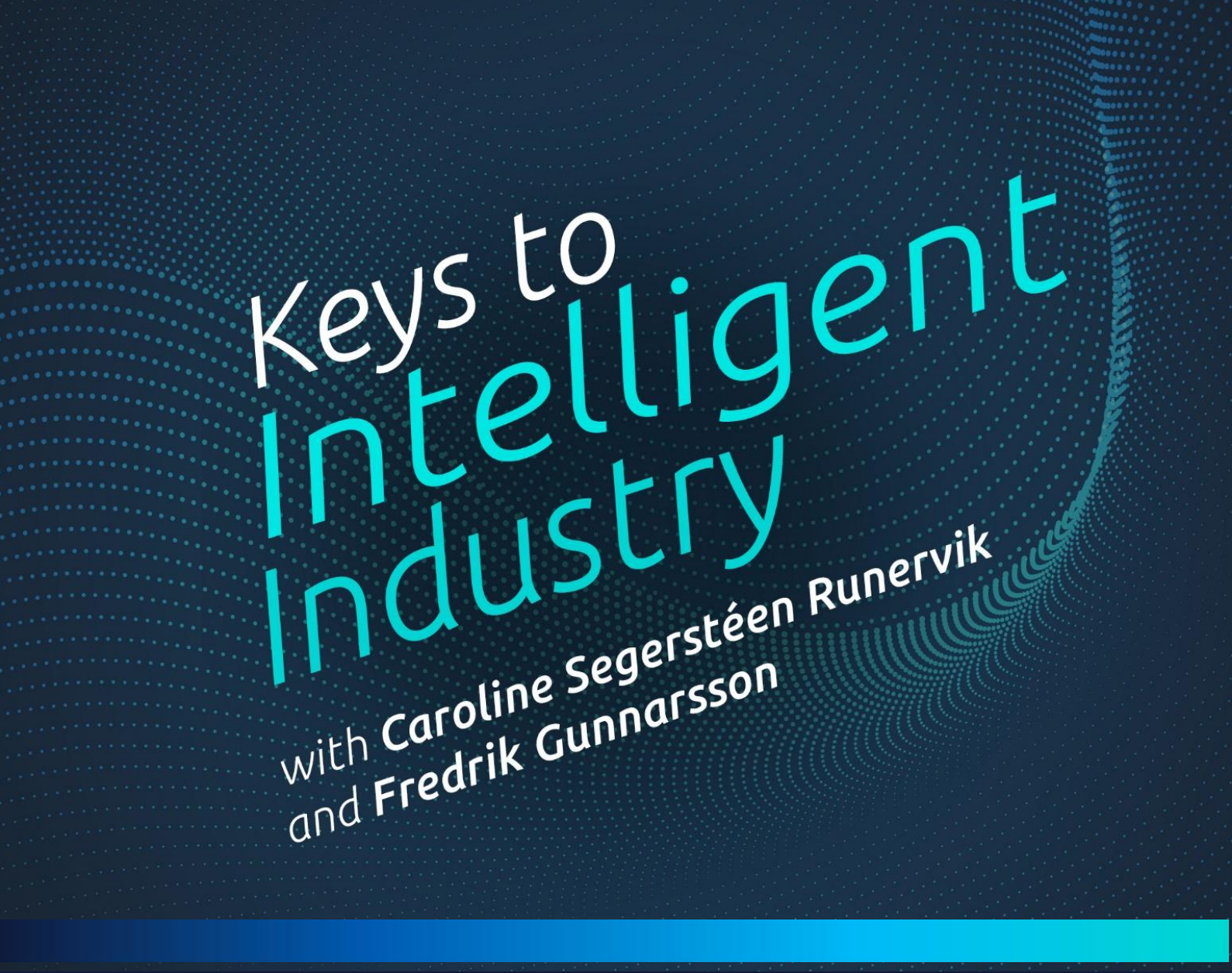
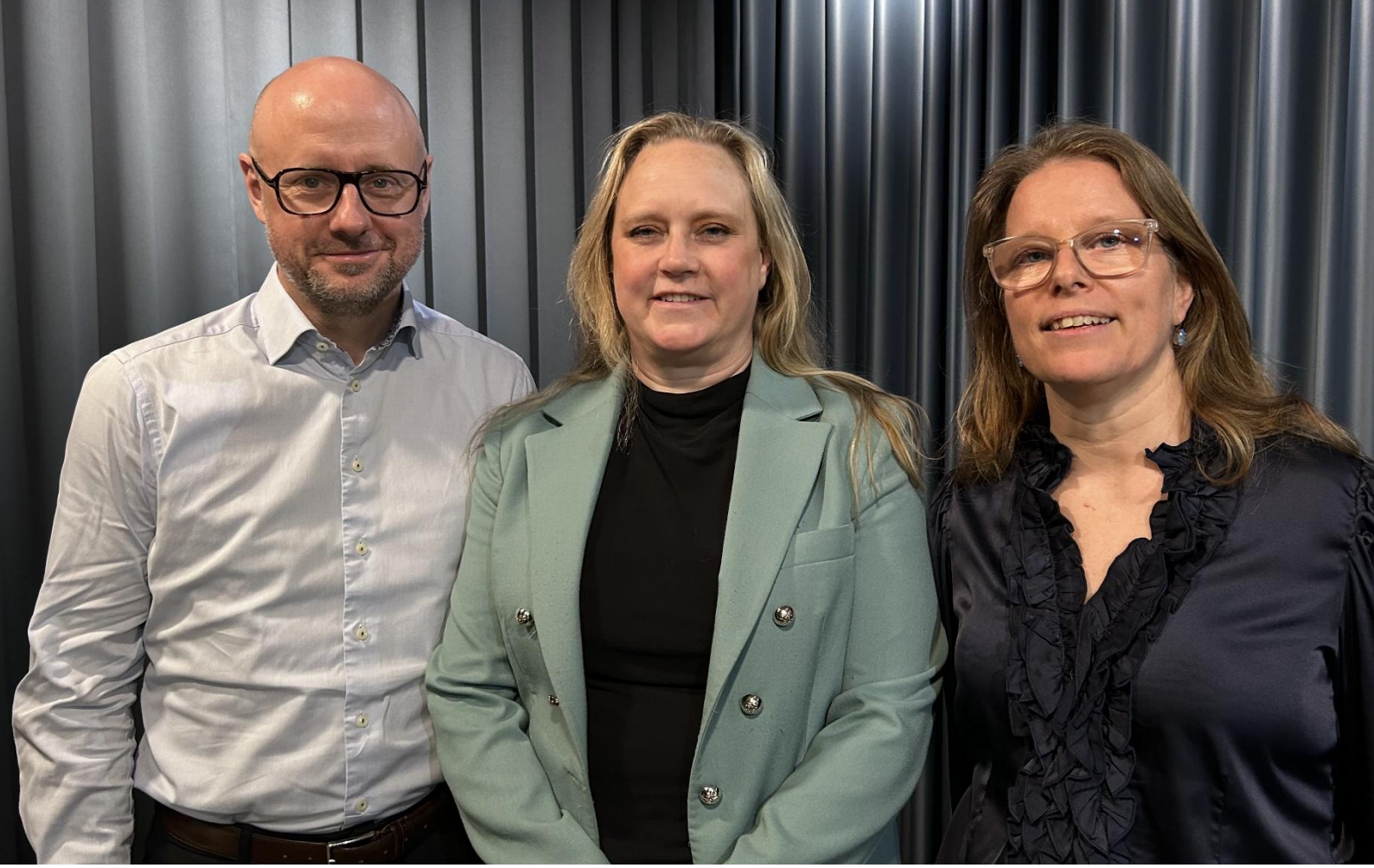


EP11

The future possibilities for connected industry, with Pernilla Jonsson, Head of Consumer & Industry Lab, Ericsson Research



EP11

The future possibilities for connected industry, with Pernilla Jonsson, Head of Consumer & Industry Lab, Ericsson Research

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[Guest] **Pernilla Jonsson**

And when we go into this immersive internet that is mixed with the physical world, we will live in a cyber-physical continuum where the digital and the physical is intertwined. And that will enable us to create totally new applications.

[music]

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

Welcome to another episode of Keys to Intelligent Industry. So, Fredrik, how are you today?

[Host] **Fredrik Gunnarsson**

Very well, thank you. Very well. Monday, new week, sunshine outside, so very good.

[Host] **Caroline Segerstéen Runervik**

So Fredrik, it's a new week and new opportunities, but you've just coming back from Hannover Messe and we were actually recording one of our initial podcasts, last year from Hannover Messe. What are the key trends and takeaways that you take with you from this year's Hannover Messe?

00:00:53 [Host] **Fredrik Gunnarsson**

It was a very intense discussions in Hannover this year. New trends, new breakthroughs, but also given the a bit of a turbulent geopolitical situation and the economy situation globally. Still a lot of discussion around supply chain, resilience, flexibility, sustainability, AI everywhere in all the discussions, in all meetings, in all panel discussions. Security, a lot of discussion is about scaling, maturing, setting the foundations. We know what we want to achieve. We have seen the use cases. We know the technology is available is there, but how do we really scale that? We called it how to manage sort of a compound solutions in the Capture Online discussions. How do we actually combine the different trends and technologies in really making a step change. So that was interesting.

[Host] **Caroline Segerstéen Runervik**

So truly go from test beds, proof of concepts to really scale across organizations.

[Host] **Fredrik Gunnarsson**

Absolutely.

[Host] **Caroline Segerstéen Runervik**

As this podcast is the Keys to Intelligent Industry, do you have like two keys that you want to mention, two key learnings that you want to mention from Hannover Messe.

[Host] **Fredrik Gunnarsson**

There are now coming true technologies and proof points that change can happen. It can actually happen quite quickly. And one of them is, I mean, again, even if it's a buzzword everywhere, the opportunity is now coming with AI and Gen AI, where you can accelerate significantly compared to before. So you can really unlock some of that potential we have been sort of wanted to address for quite some time. Another one is the new solutions coming for truly creating that data layer on top of the physical assets in, for example, in a factory where you could, where we saw new players and new partners we are working with, really unlocking that and creating the connection between different type of physical assets in a very nice and seamless way. So some really eye-opening and interesting to build further on in the discussion going forward.

[Host] **Caroline Segerstéen Runervik**

Thank you for sharing, and I'm sure we're getting back to Hannover Messe in a while.

[transition sound]

[Host] **Caroline Segerstéen Runervik**

So today we're also going to, of course, have a very interesting guest with us. We have someone who is a passionate humanist working in the heart of technology. So welcome, Penilla Jonsson from Ericsson.

[Guest] **Pernilla Jonsson**

Thank you so much.

00:03:14 [Host] **Caroline Segerstéen Runervik**

And Penilla, you are leading the Consumer and Industry Lab at Ericsson, but you also sit in several boards, besides being part of EVA, you're also part of the board of RISE, the Research Institute of Sweden. You're also part of Valenby AI Autonomous System and Software Program, Humanity and Society. So warm, warm welcome. So let's start a bit, I don't know, do you have any reflection on what we just discussed on Hannover Messe? Anything that comes to your mind of topics that you think we actually should focus even more on?

[Guest] **Pernilla Jonsson**

I am so excited to hear about that you were actually at the Hannover Messe because my organization was not there and haven't been for a few years because, you know, Ericsson Research was part of shaping 5G. And now we are all occupied in 6Gs. So I'm excited to hear what you hear from all the industries on the floor when it comes to advanced connected industries and what their next paces are in this space.

[Host] **Fredrik Gunnarsson**

Yeah, no, it was indeed a topic which discussed A lot. We were also visiting the Ericsson booth with some Swedish and Nordic clients and a lot of discussion. And it's really, we're really getting a lot of interest and a lot of good discussions and the true enabler, the 5G and connectivity is for a lot of the use cases we have on the job floor, but also out with connected vehicles now, software defined vehicles. There's so much things which are leveraging the 5G and connectivity capabilities, but also the mission critical communications where we see now really ramp up of the police and the ambulances and the firefighters using 5G. So it's really fascinating to see the development. Yes, indeed.

[Guest] **Pernilla Jonsson**

That's music to my ears, of course, because, you know, at Ericsson Research, we create this G-babies, and then when they come out to the world, it's more people like you and other parts of Ericsson who are involved. So really great to hear this.

[Host] **Caroline Segerstéen Runervik**

And talking about G babies, we actually discussed that. I think it is good for the audience to go back a little bit to the evolution of 4G, 5G, and now, of course, a lot of focus on 6G. Do you want to start there, actually, a bit describing what are the different Gs?

00:05:29 [Guest] **Pernilla Jonsson**

It started actually with the first G, when we cut the cord and were able to, at all, be able to call, right? And then in 3G came text messages and the first possibility is to actually put internet in the phone. And with 4G, we enabled the whole app economy because of the transition to the smartphone and the ability to send massive amounts of video over the internet. And then we actually also changed business models. So, before, we got paid mainly on voice and text and services like that. And with 4G came this data-based business models. And it's easy to forget that, we actually change business models all the time, right? Then with 5G came this fantastic precision when it comes to connectivities. So we are able to even perform remote surgery on patients with the help of 5G.

[Host] **Caroline Segerstéen Runervik**

Wow, that's really an innovation.

[Guest] **Pernilla Jonsson**

Yes, it is. And it's of massive use for instance, industries if you want to kind of connect precise manufacturing operations or make the connectivity really secure and so on. And now when we are facing over to 6G, we are setting this new box for what connected digitalization can really do. So we actually set the box in which innovation globally can occur. And by putting it on main devices like smartphones or coming devices, we get that innovation power in the hands of billions of consumers and enterprises.

[Host] **Caroline Segerstéen Runervik**

Thank you. This was really, really good to get that sort of walkthrough. But then coming back to 5G, has it really taken off as we expected? I mean, we have for quite many years, if I'm just talking about Fredrik and myself, and we look at the discussion we have with the market. We've been discussed this for a long time. So has it really taken off? And do you see any difference compared to industries and compared to markets?

[Guest] **Pernilla Jonsson**

Yes, I think we need to understand that when we talk about G:s, we talk about the 10-year cycle. And when 5G came, it has actually been the fastest adopted G:s by consumers in the world history. So it has never been so fast. And I think part of the reason was that we actually launched 5G back in 2019. And then in 2020, the pandemic hit. And all of a sudden, everybody had to work from home. So we had to bump up the networks, both when it comes to Wi-Fi and cellular networks to make the everyday function for the lives of consumers everywhere in the world. However, then also came the energy costs, we've also seen the electricity bills and also the increased interest rates. So the adoption of 5G standalone, which is really necessary to make 5G broadly available to a lot of companies has not yet taken off in the pace that we would want because we want it to go super fast. But we are seeing it coming on to this more and more now. And we think that this is really a prerequisite to actually harvest all the benefits of 5G.

[Host] **Caroline Segerstéen Runervik**

So it's really happening. And especially also when we discussed from Hanover Messe what's happening connected to mission critical networks, right?

[Guest] **Pernilla Jonsson**

The global development has really risen the awareness among companies, but also among public sector players of the importance of having resilient mobile networks and building a resilient society. And here 5G is a superior technology to actually do that. But I also think that as we have seen these examples actually happening around the world. So in China, for instance, one has invested a lot in private networks and making the factories really smart. And of course, one sees the benefits of that, one wants to adapt that. I think it's a pity that Europe has not really come there yet to actually adopt this innovation. But maybe in the face of what we are seeing now with the development in the world, Europe will actually get its act together and really see the advantage in actually investing in this type of infrastructure.

[Host] **Caroline Segerstéen Runervik**

I agree, it's somewhat sad, but based on what's happening on a global level right now, the technology is actually helping us also to take a completely different position in Europe because we have to.

[music]

[Host] **Caroline Segerstéen Runervik**

At Ericsson, you're head of Consumer and Industry Lab. What does that mean?

00:10:26 [Guest] **Pernilla Jonsson**

Consumer Lab has actually been around for, we are celebrating 30 years this year.

[Host] **Caroline Segerstéen Runervik**

Congratulations.

[Guest] **Pernilla Jonsson**

And we added the industry lab part when we went into defining 5G because that was necessary for that type of development. But we also do a lot of sustainability research. So basically making sure that the G.:se are producing are producing benefits for both enterprises, consumers, and making the society more sustainable. And we do that both through academic research. We do really cool stuff there. We work with global partners. Some of them are part of the Magnificent Seven. But we also then do like strategic design concepts. So we design concepts that illustrate future digital services and which demands they will actually put on the network. So we're out and about talking about this, advocating about what change the next can bring and trying to push the development in a positive way.

[transition sound]

00:11:34 [Host] **Fredrik Gunnarsson**

We have in this podcast, I mean, the intelligent industry talks a lot about the different types of application use cases… We talked about the factories, the connected software-defined vehicles, supply chain transformation, is all of this as we'd already talked about, obviously really dependent on the connectivity and the data and security of those solutions. So if we go a little bit deeper into each one of those, if we take for example the smart factories, we work a lot on the transformation of the job floor where we, as we talked about before, the true integration of the devices, the machine, the physical layer with the whole application and software layer of the factory. Sometimes we call it OTI integration, where we're really trying to extract all the data and really create interesting cool use cases, where obviously the connectivity is key. But in general, what do you see as the main benefits and the key trends in that area? And what do you expect happening in the factories and the operations in the next couple of years to come?

[Guest] **Pernilla Jonsson**

5G is actually developed for smart industry specifically, and making the data available in a secure setting, basically. But it's mostly made to build on sort of 1 factory at a time, or one digital twin at a time. 6G, on the other hand, is actually going to enable a massive set of digital twins. So we are going to be able to actually connect the information from many types of digital twins and extract information from that in a total different way than we did with 5G. So 6G is kind of putting the stereos into 5G and connecting it to other parts and making that with sort of massive. It's like a spinning journey, but for digitalization. And it's actually spinning the wheels to put different parts of the digital ecosystem together. So that's the main trend in that area as I see it. And then I think the resilience question and the securities question is really pushing these things forward. This is also necessary for the AI revolution to actually happen on scale because we need systems that can, manufacture and harvest data in massive ways. And we cannot do that without having a system that can actually generate this and share that on top of networks, of course, in an efficient manner.

[Host] **Fredrik Gunnarsson**

I truly agree. And we also see the security, as you mentioned, as a push for really challenging the current platforms and solutions in place and where we see both 5G and 6G can play a key role going forward. Then we have the whole vehicle development where I know you at Ericsson have been very active in the whole development of

connected vehicles. What do you see in this area and especially also the next couple of years?

[Guest] **Pernilla Jonsson**

What we see today, right, there are experiments in various countries. When I was in US last week and I went in a Waymo, which is a self-driving taxi. We have, robots that can sweep the streets, totally autonomous, driving without drivers and so on. That is really happening today. The next step of this, I think, is when we see these robots or vehicles actually starting to work together and being able to communicate in a cyber-physical system. Because today it's more like the autonomous cars, they scan their own world, but they are not too connected with other types of vehicles and the traffic situation as a whole. But just imagine if we could turn one of those big highways in Sweden, it's called Essingeleden, that every morning they have four lanes packed with cars going in one direction and the other one is 4 lanes and there's almost no cars. What if we could just turn that around and say, in the mornings we will have six lanes for the cars going in the, you know, congested direction and just two for the other ones? That would be pretty cool, right?

[Host] **Fredrik Gunnarsson**

That would be interesting.

[Host] **Caroline Segerstéen Runervik**

That would be really cool. I would come back and build on what you just said, because you talked about robotics and of course the innovation in the domain. What we also see right now is many applications where actually robotics and AI get connected. And we truly see a benefit of that, especially in the industry and industry applications. Is that something you also see now when you've also been in the US, for example?

00:16:19 [Guest] **Pernilla Jonsson**

In robotics, we did a lot of work for 5G, and that was mainly for industrial use. And we are seeing that coming out more and more in the factories and so on. I think the next step here is when you will have a variety of different types of robots being able to interact with each other, and also humanoid robots that is on the horizon. I, for one, can't wait to actually see these types of robots to do things and help people in their everyday life to make their everyday life better. One of my favorite examples is actually from a Japanese company called Cyberdyne. And they are not actually making robots today, but they are making exciton skeletons that actually function with brain-computer interface. And brain-computer interface reading your thoughts. That sounds really scary, right?

[Host] **Caroline Segerstéen Runervik**

Absolutely.

[Guest] **Pernilla Jonsson**

But they actually use them to these exciton skeletons to put on people that have paralyzed limbs. They have actually been known to put this on these people, and when they... use this brain-computer interface, it's electrical signals, going through the body to the body parts. And they have actually seen that this exciton skeletons in some cases have been able to restore the function of the lame limb. And then I think you see this in a totally different light, right? If you can do that, then we must discuss how can we make this, but make it ethically and responsibly so that we can actually benefit from it then. So I think there is great potential in this, but the timeline of these humanoids, I think, is still quite uncertain.

[transition sound]

00:18:16 [Host] **Fredrik Gunnarsson**

Another area which we work a lot with is the mission-critical communication, and we touched upon it briefly before. We now see the rollout of solutions for police, ambulances, firefighters to use all kinds of media in really working with security and different types of missions. It's obviously the voice, but also video, drones, connected. We work with location services. We are actually launching together with Ericsson involved in France now, just in a few weeks, those services to a wide set of users. What's your view of that area and what do you expect from that in the next coming years?

[Guest] **Pernilla Jonsson**

Yes, I think that this will grow immensely over the next few years, not the least when considering the background here of increased focus on security and national resilience when it comes to networks. And here I think mobile networks can provide a very good backup solution to what we have. I mean, it will be very important to create redundancies. And here we really need to build the capacity, the resiliency, and the redundancy needed to make sure that these networks will not go down. And then I think there are so many cool use cases. We have this fantastic concept that is developed by Ericsson Research that is about flying drones. And here we can actually use mobile networks to control how the drone flies. So we can actually police the drone, not our own drone, but any drone in the air and actually redirect it if we see that it behaves in a way that we don't like.

[Host] **Caroline Segerstéen Runervik**

Interesting. And then coming back to 6G and the discussion we had, you've just been in US, you were speaking, had

a keynote speech around 6G. You said 6G could be also one of the solutions to make the bridges across continents and across different countries. Can you elaborate a bit more on this?

[Guest] **Pernilla Jonsson**

Mobile networks is actually a fantastic example of what can happen when the world come together as one, because the kind of the manufacturing, the crafting of a new G is actually about putting different technological advancements together, not only to form the standardization of the radio network, but also to build this whole intelligent platform that can provide just the right connectivity with the right network functionality at the right time to the right user. And here, we need global understanding and common agreements on actually how this is going to work. And for that, we need all countries in the world. There is a reason why Ericsson is in 180 countries, and that is because we need the world to come together here and really set the standards for the new G and how it's going to work together. And it's also about doing this with different industry partners.

[Host] **Fredrik Gunnarsson**

Regarding 6G, what do you see as timelines and a possible development going forward.

[Guest] **Pernilla Jonsson**

Right now we are gearing up to actually set the first standards for 6G in next year. So now the standardization work is really ramping up. And we think that we will see the first commercial release by 2030 or perhaps one year, plus minus.

[Host] **Fredrik Gunnarsson**

And any specific segments which you believe will be adopting 6G first?

[Guest] **Pernilla Jonsson**

So for 6G, I think there are many different, very exciting use cases. One of them is immersive communications. You saw Meta coming out with these XR glasses on a concept level, like 2 years ago. And now we are actually publishing a research paper together with them that is about the new type of applications that would pose new demands on the network. And here we really see the true mix between XR and AI coming together. And if you think that the smartphone and the screen-based world is the optimal way to access the internet, just think about that you could have a screen wherever you want and you could actually interact with digital objects. So you just say laptop and then you know your digital laptop cups and you can sit there and push a key and you know show your PowerPoints on any screen you want. Then it's the digital twins that we have talked about already. And I think that they are a mess game changer when it comes to actually harvesting the potential of AI. And when we go into this immersive internet that is mixed with the physical world, we will live in a cyber-physical continuum where the digital and the physical is intertwined and that will enable us to create totally new applications. Basically, this means a world that is digitalized in many more ways than we see today, and that is incredibly smart and hopefully very helpful. Lastly, the mobile networks will actually become a sensor themselves. So basically, with 6G, you are going to be able to sense objects around you and place them in physical space. So basically, the network will also gather information about the world around it, and it will be possible to both kind of record how events have unfolded, predict what is going to happen in the future, and that will actually enable us to manage time in a totally different way than before.

00:24:12 [Host] **Caroline Segerstéen Runervik**

Then of course, the question is, How much do you look at Asia? Because we always say Asia is the ones who innovate the most. But now also sitting here and being responsible for this lab, What is it that you take with you from Asia? How do you get the right sort of influences from there? How do you actually work with this together with your team on a daily basis?

[Guest] **Pernilla Jonsson**

Diversity is at the heart of how we work. We are trying to understand the world in 180 countries. So we try to recruit as diversified as possible. In Europe and Sweden, we have way too much focus on Silicon Valley. We talked about Japan before, India. I can't stop talking enough about India. They have had the quickest 5G rollout in history. And the Indian guys, they are developing their own solutions, which are really, really amazing. And they are actually becoming #3 in the world economy. But we are used to thinking about India as a developing country and so on. We have to stop that. We have to start looking at India as a leading tech organization, really. And then I think we have to boost our confidence in Europe and in Sweden. I think Sweden has the potential to actually put on the little sweater in Europe and really lead us to a more digital and exciting future that is prosperous, safe and human above all.

[Host] **Caroline Segerstéen Runervik**

So thank you for bringing up India. Because Pernilla, for us, of course, having more than half of our workforce working out of India and together with all our clients, there is something special also with Indian culture. And there is such a drive. And that part of the culture, I think, is a super important ingredient also to drive the technology development forward and innovation.

[music]

[Host] **Caroline Segerstéen Runervik**

Coming back then to Sweden and us playing a very vital role in terms of bringing innovation to the world, bringing and accelerating the technology development, Sweden has a couple of years, been really driving competitiveness in Europe. And now looking at what is happening around that, it becomes even more important, right? And you are sitting in a number of boards. So what's your opinion on this? And how can we push the competitive topic even further? Also, of course, connected to innovation. And how can Sweden even further take lead.

00:26:45 [Guest] **Pernilla Jonsson**

Some of the wisest words I have ever heard is never waste a good crisis. And hopefully what we will see now is that Europe will actually shake off its bad confidence and sort of viewers' suit to the world development and actually take charge here and rise up. And I think we have seen some amazing steps in this direction. The Draghi report on European competitiveness, there is this proposal now to put 2000 billions into European research and development, which I think is great. There is several... research institutions that has really stepped up. I think one example is with AI in France and we have seen their form of large language model really taking steps out in the world. But I also think sitting on these boards, I think that we really need to think about how we set up the system for research, development and innovation in Europe to really think through how we channel all this money so that it actually benefits society as a whole. I think it's very important that we do not only applied research, but also the free thinking type of academic research. I would like to see us kind of putting guardrails around that so we can keep free thinking around a certain part of the system. Then we need to have loads of applied research that can bring the advancements of the free research into practice and develop that to the industry. And then it's another part to make the academic world and the startup community and the funding of those startups to really work. And here we need to stop the outflow of great technological innovation from Europe and really make the system, the ecosystem here, attractive enough for companies to grow also here. So I hope that we can sit together and actually find that out in a good European collaboration spirit and help the companies to think and act on global markets, but also want to stay and build in Europe and in Sweden

[Host] **Caroline Segerstéen Runervik**

So when it comes to AI, what research have seen, and actually also this year, is still that we are a bit conservative in Sweden in terms of deploying and using, especially on a leadership level. If you then look at your own organization, if you look at how you yourself work with AI and how do you drive it, that leadership dimension in your organization and into Ericsson.

[Guest] **Pernilla Jonsson**

We are a software company. I don't think that we have much resistance when it comes to AI. Rather, it's about, how can we actually harness the power of AI in so many different parts of the organization? I think for a company like Ericsson, this is a, to me, a non-issue. It's go ahead and do it. But there is an absence, I think, still, of scalable tools that are really valuable for organizations to adapt. And I, for one, I think that the true power of AI cannot be realized without making the spatial internet and this cyber-physical system a reality, because we won't have the data in order to harness all the power of it unless that happens. And I think that 6G will bring applications and services that we even can't imagine yet. And I can't wait to see what those actually will be.

[Host] **Fredrik Gunnarsson**

So when discussing with the different companies around connectivity, 5G, 6G, et cetera, we often realize that it's a big change process for the companies. And it's a competence development, it's new types of operating models needed to actually master this technology. So how do you see that when you work with your customers to actually drive the competence and change process?

[Guest] **Pernilla Jonsson**

Change is an interesting concept. When you face something new, there is always a risk involved. There is always this risk that it will not work. I used to work in the automotive industry, and then I went to a place called Småland in Sweden, where they had small suppliers to the car industry making small sheet metal components. And if you have seen one of those factories, they are super efficient. And of course, they are measured on operational efficiency. So they don't want to do anything that could disturb that process. And for us to come in and say, but with connectivity, you could do this and that and this and that and, but I know what I have and I know that this is working, And I think that here it's a kind of the tension here between what's new and what's old. I think one has to show the advantages of the new technology, but then adapt it. So, you can create an ownership with the people that is going to take on the new and create an excitement for it and minimizing the risk. And I believe very much this is something that I've been taught by Ericsson Research to work from the bottom up and not the top down. Because when the people actually doing the change, own the results and own the change and can lead how the change is going to be implemented, then it goes much easier.

[transition sound]

00:32:33 [Host] **Caroline Segerstéen Runervik**

I wanted to come back a bit to our overall theme of intelligent industry. If you look ahead, I know that you look ahead, a big change will happen just in one year, but if you look ahead like 10 years. Where is intelligent industry in 10 years, Pernilla.

[Guest] **Pernilla Jonsson**

First of all, I hope that we don't think about it as industry anymore. Because I think it's limiting a little bit our way of thinking. I hope that we see it more like business, that it can take many different shapes and that value creation can happen in different parts of the ecosystem in new ways then. In order for the real benefits to come together, then we must see different players actually hooking up and working with each other in new ways. And then we need to stop thinking so much in silos and work much more across industries and share experience together. I think that is one of the most fruitful things to do, to find your thinking bodies and create the future together with them and innovate together to find the next generation of efficiencies that we haven't really thought about yet.

[Host] **Caroline Segerstéen Runervik**

And I agree. I think there's a lot more we can learn from the B2C to the B2B market and vice versa. And that intersection is absolutely key. And we heard a lot of good examples about that from you today. So I'd like to say thank you for a very insightful and interesting discussion where we hear about 6G being, you know, the glue putting the world together. But you also came with some interesting solutions of how we could stop the traffic jam at Essingeleden, thanks to innovation. And again, you know, there is just our mind stopping us, right, thinking you. So thank you, Penilla, for being here with us, and sharing your perspectives and really coming with some cool, creative ideas.

[Guest] **Pernilla Jonsson**

Thank you so much for having me. It has been a pleasure to be here.

[Host] **Fredrik Gunnarsson**

Thank you.

[Host] **Caroline Segerstéen Runervik**

Thank you.

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