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Sustainability Unwrapped, a conversational podcast about responsibility, ethics, inequalities, climate change, and other challenges of our times, where science meets practise to think about our world and how to make our society more sustainable, one podcast at a time.

Hello and welcome to this episode of *Sustainability Unwrapped* podcast by Hanken School of Economics. On this episode, we will talk about how to create human-centric and sustainable internet optic solutions.

My name is Kimia Aghayi, and I will be hosting this episode from Helsinki. I am a first-year doctoral student at marketing department. And I am joined today with Tomitako from Oloop, who is an entrepreneur futurist in technology, digitization, and IoT solutions.

Welcome, Tomi. Would you tell a bit about yourself?

Thank you. And lovely, lovely day to be here. And I am happy that you invited me for participating. And about myself, I have a history of nerding, if you can say so. So I have a long history of creating applications. And I actually started myself as a developer, mid '80s. So more than 30 years ago. But the last-- more than 25 years, I have been more or less managing teams and projects of creating applications for several industries.

And I have been super lucky when doing applications for large corporations that I have been able to be always on the end-user side. So talking about the web ops, web banking, and mobile applications, and consumer applications. And a little bit six years ago, when I joined the IoT business, it was actually a good history from my perspective, when starting to create business for IoT, that I actually had this history of consumer applications to understand the human-centric design. It was a good background for me.

So that's me, nerd, and being the person behind different web ops and web banks and applications.

Thank you very much. I'm so excited to hear your stories and thoughts on this issue. So basically, in this episode, we're going to talk about customers, internet of things, and how these are approaching us to sustainability.

Without a doubt, IoT, which is Internet of Things, I mean, it refers to physical devices around the

world that are now connected to the internet. And all are connecting and sharing data. Without a doubt, IoT is one of the world's enablers for responsible digital transformation and one of the aspects of sustainability.

The Word Economic Forum report, which was released on 2018, estimated that industrial IoT, which you are in right now, can add about $14 trillion of economic value to this economy by 2030. And this report also says that about 84% of IoT deployments are currently addressing or have the potential to address the sustainable development goals as defined by the United Nations.

So this is the important effects of IoT on different stakeholders like governments, local, private sector, regional, and national parts of government, as well as development agencies, civil society, and so on. But what I want to talk today with Tomi is about humans as one of the main stakeholders and influential factors in this ecosystem.

So tell me, why do you think we should consider humans in designing and developing IoT? And first, would you just explain a bit about what does human-centric mean actually?

Yeah, to understand the human-centric approach for IoT, I would first use one minute to explain how IoT process-- and how the value happens. It's actually quite a simple process. There are three steps when we are talking about creating value or creating business out of IoT-- you have sense, you have think, and you have act.

Sense part is that you have some sensor creating the data. Think is that you have some kind of data storage, that you have some cloud or big data storage where you store this data, and you do some kind of analytics. But then you have the act part. And actually, the value happens on act part.

So now, sense, think, act-- and you understand when the value happens in the act part, and actually, the sense and think part, they are always a cost. And when we are talking about the business modelling of IoT, you should always start from the act, not from sense or think because they are always a cost part of this thing. And the problem in this whole IoT business is that it is super sense- and think-driven.

So it's like a cost that preventing that sense. That sometimes, I have actually seen startups, new companies popping up, creating sensors and gateways and platforms without any understanding what is the act. And now, to understand what act means, let's have the very, very stupid example.

Let's say that we want to use IoT to make sure that coffee machine works because coffee machine, as well, we know in learning and knowledge working environments, it's a source of productivity there.

You need to have, at least in Nordic countries, coffee must be there. Or otherwise, I don't work.

So let's have an example of IoT. Let's have a technical approach, how coffee machine works, and how we could answer that from the IoT technology approach. You create the sensor, which you attach to this coffee machine. Which actually measures the data from the machine, how much you are using it, how many lattes you take out from the device. Then you can start doing the think part, which is how many lattes you can do with the two litre milk storage on that coffee machine. So having this think part, understand that milk will run out when I order or fill 28 lattes.

But the act part is that someone actually needs to come to fill that milk in the machine so that the next person can have the latte again. That's the act part. Because without the act part that actually someone comes to the machine, the machine doesn't work anymore because you don't have any milk there.

So the technology approach is that you put those sensors, and you start to store the data. You do the analytics that after five lattes, I need to send a message. The act part, as a text message, the nearest person who comes in and puts in more milk. So that is a technology approach for the act and/or the use case-- make the coffee machine work.

Let's take a human-centric approach for this kind of problem solving. If our act is that we need to provide coffee to people. And someone needs to be there on the machine before the milk runs out, human as a sensor-- I have this recent or great idea that we should use more human capacity as an IoT sensor. So that instead of having these sensors on that coffee machine, and this expensive data leg, we could have a simple button next to the coffee machine with a label saying that when the milk will run out, or there is something wrong with the coffee machine, press the button. And after 10 minutes, someone will come and fix the thing.

And now, because we as humans, we want this coffee experience to continue through our colleagues and friends using the same coffee machine-- and we know that it will take a minimum 10 minutes that someone comes to bringing more milk there-- we actually start predicting, as humans, because we want this coffee machine to work. So we started pressing this button next to the coffee machine 15 minutes before the milk runs out. Then, someone comes and helps, and machine is working.

So even human and actually can be a predictive maintenance computer by nature. And this means human approach and human as a sensor design approach on IoT environment, which is actually super technology driven.

So good to somehow use human as a sensor and collect and use our humans to be a source of the data instead of these technical solutions, which are of course getting cheaper and cheaper all the time. And that data legs, you can buy data storage from Amazon or Azure cloud, almost free. So it's not any anymore cost, but this would be a human-centric problem-solving approach to the IoT process.

Very good elaboration. Thank you. And I was actually going to go back to this idea of human as sensors of yours that you have mentioned here and there. It was super cool, I think. But as you mentioned, understanding customers towards IoT is the key to find solutions about IoT deficiencies or develop the IoT in the business.

Note, I just work on a project of implementing of smart cities. And we were studying all the aspects of the smart city as an ecosystem, different aspects. But it was a strange that neither in the economic research nor in real-world business cases, people as so-called smart people, were not considered as much as other aspects.

And this actually came to my mind that to reach to the highest level of productivity and efficiency, any technological ecosystem like smart cities or smaller ones like building, people are the main actors and have important roles. We can have fancy technologies and smart devices and everything. But how do they function without people who understand them, like them, and would like to contribute to it, as a kind of example that we just made about contributing to the coffee machine?

So let's talk a bit about the solution. I know that you are so experienced in IoT innovation and digitalization of the real estate industry with a focus on doing it human-centric. And you are also co-founder of empathic building startup, that is a house interface for [INAUDIBLE], which is super cool.

Would you like to explain more about the idea of how does empathic building come to your mind, and how does it function, and how is it empathic to humans among other things?

All right, if we first start-- a little bit explaining what empathic building means. It's a little bit still a vision. However, I strongly believe that future buildings are empathic. Meaning that, that the building or actually the applications installed for controlling, for example, indoor air quality, they understand human quite deep level that how end users are feeling when they are using the physical space. For example, the indoor air quality or lighting or service perspective. So the future software would understand how people feel, and they start catering the services based on that.

And this is actually the [INAUDIBLE], this kind of technical sensors and collecting data from humans

and using human as a sensor. So let's have an example. In [INAUDIBLE], the company I work with, we have designed an Oura ring. Which is a quite famous Finnish innovation, collecting biofeedback from the end user that you can measure your pulse quite accurately. And you can have data analytics about your sleep and activity and so on.

And for these type of wearables, it can be a clock or whatever. It doesn't need to be a ring. But whatever wearables that can read our biofeedback, they are going to be the future sensors to understand how we feel.

We can for example, already measure stress level from pulse data collected from me as a human sensor. When we understand my bio-profile and how my pulse is actually-- my heartbeat is acting in a different type of stress situations. So when understand my bio-profile and having the real-time analytics, the future applications actually can be empathic understanding, for example, my stress or frustration levels.

And I predict that the first applications that are going to use this human as a sensor and empathetic analytics will be in the gaming industry. Changing the game difficulty level based on my frustration as an end user or the other player so that they can adjust their difficulty levels.

But I predict that this goes through the operating systems when you use your phone and need to go to the buildings so that the building automation is starting to cater the exact indoor air quality, like temperature and humidity, which my biofeedback wearable will detect that I need in that situation. So that means, in public buildings, we are on a journey to there. We are not yet there, but that's the future of IoT. And that's why I also like the human-sensor approach. Because the most valuable data comes from us, from the end users, that we can provide to future services.

And that goes also to the sustainable world. Because if you are setting the indoor air quality based on the actual preferences of the end users, the end result is sustainable anyway. Because when there is no population in a building-- which now happens during these COVID times. We are working from home, so buildings are empty. And it doesn't make any sense to cool them or warm them. [INAUDIBLE] in a Nordic place, we need to actually warm buildings. And in a more warmer area, we need to cool them. Both of those needs energy. And it doesn't make any sense to cool them or heat them if we are not present.

And so the human-centric design and using human as a sensor, we could provide that kind of service which creates the best possible end-user experience. And we can call its side-effect is this sustainable-- because when we really understand the real time utilisation and the usage, [INAUDIBLE]

many people [INAUDIBLE] about the indoor air quality needs. That's the future, empathic and sustainable buildings. It's like a current component of that.

And how does it actually function? Basically, every employee or customer is a sensor that exchanges data for that building? Or as a [INAUDIBLE]?

From the technology perspective you can do it multiple ways. So you can have sensors installed to the physical space-- camera sensors, movement sensors, indoor positioning. There are several ways. Or the end users can carry devices which can discuss between the data collection and be a central source of this data collected. So there are multiple technologies that we can use. Probably, the future is a combination of different data sources.

So it's not like you always carry a device which is sending the data. Sometimes the device can be installed to the building itself and using analytics, like camera analytics and stuff like that, to collect the data that we need. But of course, the future is that everything will be measured and recorded, and we will have more and more live data that we can start creating these kinds of future end-user services.

Interesting. Actually, what type of challenges have you faced so far in this concept? I mean, from the customer side, or within the side, for example, there might have been some privacy concerns and trust concerns from customers? Or even managers that do not believe you or do not actually trust [INAUDIBLE] things per say. What were the main challenges that you have faced?

Well, I think now we are living in the era of when they look at the data collected, and the data we have and applications are actually much, much smarter than we as a humans are. I'm not saying that applications are already intelligent, but for certain data collection and certain type of analytics perspective, they can process already faster and more data then we as humans.

And now, actually, the responsibility of creating future applications that we can call them sustainable or trustful or-- how you can say that-- we need to trust applications. And the reason is that now we can not. We have seen that we are already, for example, we are using the social media data generated and created by us as humans. We are already misusing this data. And this misusage is done by-- we are solving-- we are doing the act part.

So we are solving the use cases, which the data originally was not created for, and that will be the future anyway. All these sensors, all these cameras, all these wearables to fulfil the important use case for us, for example, better customer experience, better services. They are actually recording

and storing data, which can at the same time violate our privacy while they are fulfilling the most important use cases for us.

So the same data is super valuable but at the same time super dangerous. The same-- actually, the same data, or the combination of, for example, location and human and feelings and biofeedback-- combination of that can be useful and harmful, same time. And unfortunately, we currently, these mega-corporations who are using this data, they are not necessary use that data-- well, how you say, responsibility-- or I mean, ethical way.

And now, it is super important that too often [INAUDIBLE]. Now that we are not doing ethical applications, we should now start doing them. Because the only way-- for future, everything will be recorded. Every second, every time when I go wherever, and even inside of my own home, there will be Facebook and Alexa and Apple TV and my phone and my wife's phone and my kids' phone. Everything will be recorded even in my private house.

So it is super important that we, as an end user, we understand that. And I believe that the only way to fix that those mega-corporations, which are now brutally using our data, that they should start changing their way of using our data-- ethical way.

Because the other way would be that we should start protecting our data at a very deep level. And maybe the future is a combination of that. So that lets say that these kind of my data storages, my data clouds, they are popping up so that all data related to me, is owned by me, not the corporation X or Y or Z. But it's owned by me, and I have a full control of that data that I have.

And when I give something out to the corporation X, for example, my doctor or someone treating me, which is super valuable for me that they have my data because then they can do proper analytics. For example, using my biofeedback for one year would be very valuable data to my doctor and so on. So me, as an end user, I could fully control what I give out from my data, what period of time, and fully understand that the company or who is using this data, they treat it only for the use case, which is valuable for me and nothing else.

What a beautiful utopia that you just created. I hope that it will happen someday.

And did you know that we as an end user, I call it end-user democracy. We have full power to make those decisions. We have been criticising, for example, how Facebook is using our data. And [INAUDIBLE] necessary respect our privacy, and they are using it to make money. It is their core business. They want to target better ads for us, and they are selling our data. And that's their business

model. But we as an end users, we have a full power and full democracy, in that sense, to stop Facebook today.

We all delete our Facebook accounts today, end of business. So we still, as end users, we have full power of controlling who we [INAUDIBLE], and who we [INAUDIBLE], and what applications and services we are using. And I predict that when the understanding of this rises, so we as an end user, we understand how our data is used, we get more tools to control it. And we start doing these kind of decisions as end users. We start consuming more sustainable way.

And because we have that power, if we want to stop the climate change by eating less meat, we can do it today. We as an end user, we have a full power to make that decision today. If I stop, drop half meat, half from our diet today, we have the full power to do that.

That's what I call like an end-user power of making sustainable selections in our daily lives.

Which is a great point of view because this is one of the other reasons that we have to have human view from the IoT solutions. Because humans, and as you mentioned, end users, and as I mentioned, customers, should have the power to change everything and so on.

But how about the culture of the customers, was it a challenge? For example, I know that you have presented your product as empathic building in different countries. How did different cultures encounter these services?

[INTERPOSING VOICES]

It's actually not so deeply affected by the country-level culture. The effect is more on a work cultural perspective. And I have seen, we have now installations almost in-- soon we will have installations in 20 different countries.

And one thing, which is common, which we can see from the empathic building data is how people and end users are using the solution. And what they are using it for. The only difference between different countries and inside of that even, inside of the large corporation, is the actual work culture.

So people and end users, who have more open sharing and a feedback culture, they are generating more quality data, using empathic building as a tool. How they collaborate, how they interact, and so on, this is clearly visible. And I have not seen a difference, the country-level differences.

Of course, they are awesome. Meaning that, for example, we have customers in Japan, they have a

totally different work culture there. But even in Japan, I can see companies and teams who already have a similar work culture than, for example, our customer in Norway or in Sweden or in Finland.

So somehow, and of course, this might be so that the companies who are currently empathic building customers, they actually already have this similar type of work culture on their organisational level already. So no matter which country they are. But of course, we see that there is a different type of market potential in different countries and different areas.

But I can see even that, for example, in India, there are lots of companies who are sharing the same work culture than companies we have customers in Nordic countries. So somehow, I see the future so that when our planet shrinks, in that sense, because of the real-time data and connectivity and these digital tools that we [INAUDIBLE] several [INAUDIBLE] at the same time. So this will boost up these unified working calls, where the actual cultural and historical effect is not so heavily involved.

And I could even predict that because of how we are using these digital tools-- let's say that, for example, when we started this recording, we didn't physically meet. So there was no way of us interacting the same way that we would do it when we would be in the same studio or in the same location. So what happens now is that when we are more interacting with other people-- through these digital channels and different teams and Zooms and go to meetings and whatever digital tools-- these cultural things, they are a little bit staying there as a background.

Because when I go to Japan, there is this culture in business to business meetings, where you share your business card. And you have these certain cultural routines that you do with Japanese customers. But you actually don't do them when you have these teams meeting because you cannot exchange the business card like you do physically in the same room.

So it might be that the future of using these digital tools, will actually shape our ways of working. And is there going to be like a digital culture that is popping up? I don't know. But this might be something which is the outcome of these digital tools, and [INAUDIBLE]. And actually [INAUDIBLE] this remote work and digital tools use it--

[INTERPOSING VOICES]

--10 years, cultural, digital ways of working cultural jump-- one day.

Hopefully, and actually like the idea of global relate something that everything would be the same in the future. And there was [INAUDIBLE], had an article about the different cultures, and that IoT

business models should be [INAUDIBLE] in different cultures, should be implemented differently. But there was another--

I don't believe that at all.

Yes, I was going to that. There was another article five years later that actually rejected this idea and brought up the idea that you just said that it will become a more common spirit using these kinds of digital and IoT solution devices.

I strongly believed that. And that was a [INAUDIBLE] funny thing. I read the article today that usage of the word "lockdown" has increased 6,000% than it was one year ago. So these kind of things, when things happened, then we must do something. It actually speeds the development hugely. And that the world is never going to be the same from the digital working cultural perspective.

And I think that has a direct correlation. This discussion we have about is there different cultural ways that we should design our IoT business. And these future digital things and augmented-and-built to our realities is what we are doing because the empathic building is actually a digital copy of the work environment where we make the invisible data visible.

And I don't see the tool perspective any difference, with contrary to the installation. Of course, there is always a country-specific content. And in a little bit different ways how end users are using the platform and digital win, but the business model and the actual service is common. So when companies who are listening to this, and they are thinking the design, and should they create a different go-to market business models with IoT for the different countries, I think only technology perspective, not cultural perspective.

So for example, in some countries there is no wireless. There is only wireless connectivity. In developing African countries, they have better wireless connectivity than wired connectivity. And maybe those kind of technological approach, but I don't believe this different cultural perspective.

[INAUDIBLE]. So as my last question, I would like to ask, what are you seeing are the gaps that have not filled yet for this area? I mean, for younger researchers or tech developers that are thinking in terms of IoT solutions and sustainability, what do you think hasn't been done yet? And you really saw that as a need in the marketing industry?

In most of the involving and developing technical and future development, it's us humans. So we are the only element actually slowing the development down. And there are two main reasons.

One main reason is the competence. So we are talking about the real-time data processing and things, which didn't exist 10 years ago. So we didn't even have a school that could prepare us for this technology kind of thing. So we definitely have this competence gap, which is slowing this down. And I think that's the biggest slowing factor when talking about the global IoT the business involvement then.

And the second biggest thing is us as humans. And a little bit related to the competence, but also the way, for example, how our brains work. So I went to school 30 years ago. There was nothing relayed to me about real-time data processing AI robotics, nothing learned. And my whole brain actually started to categorise world from that perspective. Let's call it analogue world perspective.

And now, when I would need to learn new things, it actually might be that it is super heavily violating how this information is originally stored to my head. And actually, I should use quite a lot amount of energy to override that and even change the way [INAUDIBLE] things inside of my brain.

And quite many people-- and more older you get, the more difficult it is. So we see the generation of people who doesn't want to spend that energy of changing their thinking related to the new technology and new research and how fast the technology is involving. So humans, we are the slowing part of the equation, why these kind of IoT and real-time data processing business ideas are not rapidly changing the way, for example, how we do business in real estate. [INAUDIBLE]

Though, I think the only way to change that is that either we wait until there is a new generation coming, or we constantly start-- and actually patiently start discussing and educating these existing decision-makers in very key positions, that they start spending some energy to overwriting things that they have learned 40, 50 years ago. Because those are the persons now making our decisions [INAUDIBLE] of future generations. And they are goddamn slowing this thing down. Everyone should spend some energy to think about that. And evaluate your own life. [INAUDIBLE] and the new data, which is there, available every day.

Thank you. I think it was a good conclusion. So just focusing on the importance of studying human perspectives without all these technologies and innovations and everything.

So I think that we are [INAUDIBLE]. And I just hope that we could have raised some question marks in the audience's head about this particular area to think about [INAUDIBLE] and other situations, [INAUDIBLE] schools and marketing [INAUDIBLE]. Thank you very much, Tomi. [INAUDIBLE] conversation. Thank you for joining us.

Thanks.

[MUSIC PLAYING]