

CONTEXT: Interviews conducted as part of an investigation into the barriers to, and opportunities for, achieving Circular Synthetics. Research was funded by Business of Fashion, Textiles and Technology Creative Research & Development Partnership (BFTT CRDP—£5.5 million) led by the University of the Arts London, part of the UK Creative Industries Clusters Programme (CICP) funded by the Industrial Strategy Challenge Fund, and delivered by the Arts and Humanities Research Council (AHRC) on behalf of UK Research and Innovation.

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Interviewee: Senior fibre scientist, cellulose regeneration business

1: Interviewer

2: Interviewee

1: Just to explain that, we're trying to ask the same questions of everyone. Obviously, that looks a bit different in different situations. I just gave you the basic ones, but we'll talk through them and adapt them. The other thing to say just briefly is that the first part is straightforward questions and then the second part I'm going to post a Google link into the chat. I've just got a couple of worksheets. They're not really worksheets, but they're just to type in, so we can both see them. Then relating to two specific examples of products that are produced by this case study, just to see if it changes what comes out of the conversation at all. Then we'll look a little bit of what roadmap piece-- How you think it looks like for the next five to 10 years.

Then quickly just go back to that definition I sent through. I imagine you haven't had a chance to look at it, but I'll post it up again, and then if either-- If you don't have a chance to really absorb it within the call, then maybe a later date. It's an extra thing. Sorry, me chatting. Any questions at this point or shall I carry on?

2: No, you can carry on.

1: Carry, okay. The first question is quite straightforward, it's a background question. Can you tell me a little bit about the background of your work with [redacted]?

2: Where I met [redacted], that was when I worked at [redacted], which is where I finished my PhD. Then I was employed in the project, [redacted]. I have worked one of the only researchers, 100% in research to fashion. My work there concerned recycling of cotton-rich textiles you could say. In the end, we started off looking into recycling 100% cotton textiles because as it is, my supervisor comes from the forest industry, which is very big in Sweden. He thought, "Well, cotton is cellulose, so we could use that in a similar process to what we do in viscose," but we soon found out that these 100% cotton textiles that we thought, as we didn't, or he didn't know anything about textiles when we started out-- In the textile business, that 100% cotton textile were common because in Sweden-- At home in Sweden the home textiles 100% cotton sheets is the one dominating now.

This was 10 years ago, it's starting to come new materials. If you go, most people-- If you go to IKEA or one of the other similar stores, 100% cotton is still 95%. What I've heard from [redacted] is that it's much more common than polyester blends at home for home textiles as well in UK, for example. I don't know. That was what we started off with. Then we realized that if we want to get a large amount of textiles, we need to focus on this cotton-polyester blend because that's where we have the service textiles and that's where we-- It's a good starting point.

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Then he had an idea that I developed, and then I continued developing during my postdoc period after I finished my PhD. This is about the separation of cotton. It's a very simple and easy idea. It's one of those ideas that if you just have a little background info and then you show the chemistry you're like, "Why hasn't everyone thought about this?" It's just really [crosstalk].

Then I applied for a job at this company where my supervisor worked. The interesting thing is they always were my partner and my supervisor always been working there because he changed just after he was involved in [redacted] but he was employed there three months after I started my PhD but continued as my supervisor. In the ad, there was nothing about textile recycling, and it was completely process development and on the clock process is where you make paper pulp because we're one of Sweden's largest paper pulp producers.

When I started then, I realized that they had been developing or taken from the idea that he had. They had developed another process, which is similar but kind of inspired by the process I worked with and now they were actually going to scale to up to factory industrial scale so that was why I got the position. It's a weird being [unintelligible 00:10:16].

1: Okay. How has that been? Are you enjoying it?

2: Very much. After working in [redacted] for so long and so many sustainability expert saying that, "Well, you can't trust circularity in textiles, because everything is in the kilograms gain," and just fighting for years and thinking that, "I'm really doing kilograms gain here. It's good. I'm one person at a university, can't expect more," but now, suddenly, we're going into ton sale and it's like, "Yes."

1: What do you think with them? What's their motivation? They were primarily a forestry product. Are they a profit? How is the company funded? Is it a private company?

2: It's corporative; it's owned by forest owners in southern Sweden. 52,000 small forest owners.

1: Gosh.

2: They're like family farms, forest farms, which is common in Sweden that you have a small farm which has forest [inaudible 00:11:50] and then you hire a company to take care of different parts, both, growing and yes. They can become members in this company, so it's a member-owned company. It's very special.

1: Yes, sounds amazing.

2: It's very good because it means that we're not on the submarket. That means that it's not very short-term. It's, on the contrary, very long-term.

I guess [redacted] also talked about [crosstalk]. She always said that if anything's going to happen, you need a large company that dares to look to do something that has larger muscles, but she never really dared to trust that [redacted] was going to do something. Why? Because circularity, we work with having to solving-- One of our mills is a half dissolving pulp, so we produced dissolving pulp for viscose and that means that we have to follow the trends in textile industry. One of the major trends in textile industry is circularity. It was an obvious connection that we had the knowledge in-house.

My supervisor, he had the idea, we constantly do surveys of what's going on, what's the next trends and try to be active in working. You can't just continue producing pulp for newspaper, because then you'll be out. So it's about following.

1: Do they see this as supplementing the traditional sale of wood pulp?

2: Yes, they have a business perspective on it. They're not doing it for charity. It's a business perspective. If we can be first here and produce large volumes and we already have robustness of being a large company, that means that we can handle the large investments. This small startup that means to start up everything. We do this. We have this factory incorporated on one of our other factories which means that we have recycling of chemicals and handling of all these chemicals already on-site. That doesn't have to be upstarted and we have operators that are used to working with this, we have all the structure.

1: You've got a head start.

2: Yes, exactly. It was like that was the business opportunity.

1: Okay, perfect.

2: Also, the seeing that were many that were always at least saying they were willing to pay more for this kind of pulp.

1: Okay, that's interesting. What's the feedstock for that, then? Because you have all the infrastructure for processing it but presumably, all the upstream textile waste preparations has to happen at somewhere else.

2: That's so hard. So many of the questions I can't really answer, but one of the pieces that went out this pulp pretty bold and early, because we only produced 500 or handled 500 tons. That's much sounds a lot, but it's not a lot. Not in a large factory. Not one that produces 200,000 tons of dissolving pulp.

Sometimes it's not very much, but we needed to do that because we couldn't go out and start buying up textiles. It's very weird for first companies to start buying up secondhand textiles without having told that we are actually working with textile recycling. That was one of our main goals with our first campaign that we needed to know what's the market for secondhand textiles, and exactly where we get the textiles from? I can't tell you.

1: No, okay. I don't need to know specifically. I was just trying to get a handle on what processes you don't do. The textiles come to you and it is sorted already.

2: It's sorted. That's all I can say. Yes, it's sorted, but how--

1: You don't have to disclose that. This is not about details really. It's just about understanding.

2: It's post-consumer. It always is post-consumer or pre-consumer, but we try to port the post-consumer as far as we can.

1: Okay, perfect.

2: Something we have discovered is how extremely all the logistics systems are lacking. It's very hard to buy the textiles we want on the market.

1: At the moment you're selling on-- Is it at the stage where you can sell it commercially on afterwards the material?

2: Yes. The customers first know that we have and we have already working with it since we are viscose pulp producer. Those costumers and those networks already established the buying of our textiles before us. That's what we miss, the logistics network and customer network.

1: The project that comes out, does it have to be accredited or validated in some way to ensure that it's--?

2: No. We have a list of things but we need like a product.

1: I'm just wondering if your customers want to specifically buy post-consumer pulp or something like that, is that an issue?

2: I can't answer that.

1: Okay, no worries. I'm going to move on specifically to the polyester side of the question now. At the moment, what happens to polyester in your experience within this process?

2: Today, the polyester is burnt. This is a part of the chemical recycling process, or what's called the Kraft process where you produce Kraft pulp. This is the most common paper pulp and production. The energy that we get out goes either to district heating or to electricity. We have turbines that transform it into electric energy, but we also have district heating of the communities, so it's fine.

1: Okay. Is there any potential to-- You said that the specific processes you have at the moment produces a particular kind of residual.

2: We're looking into it. Maybe not so actively, but it's definitely on the list of what to do. We have a lot of things that we need to do before.

[chuckling]

1: Are you able to say typically how much of the textiles that you're getting in, how much of it is polyester, the residual?

2: It is very important for us and we have a number that I don't remember, but if it's too much polyester, it's let's say, like this, it's the cellulose, it's the carbon that we make money on. If we get too much polyester in, we won't make any money. We try not to get as much polyester. On the other hand, we are one of the few handlers that can handle as much as-- We could handle 90% polyester if we could have a business case there. Technically, we could handle that much and that we were alone on. There are a lot of companies that are trying to source post-consumer, high cotton, white textiles right now for textile recycling purposes, the other companies especially close to Sweden.

If we can go a little down in the cotton, we have a segment which is not available to many others.

1: That's really interesting. It's like scales, isn't it? Actually, if the price of polyester went up, then it would-- Sorry, of recycled polyester. The demand for recycled polyester went up, then you could actually buy in the cheaper post-consumer textile. I can't even think how to say it. The blends which you're not taking at the moment, basically, they're with a higher proportion of polyester. It's the potentials there anyway if something drastic happened in the market. At Interview date: 08 06 20

the moment, is the polyester that comes out of the process, could it be used or does there need to be a lot more work done to make the process?

2: A lot of work needs to be done.

1: All right, okay. To make the polyester fraction usable in something. That's really interesting. I know that obviously cellulose in terms of circularity has or in terms of recycling anyway has been quite far ahead of polyester in a lot of ways in terms of commercialization and upscaling. I know this is not your specific area, but I'd be interested to hear what your thoughts are and what the main barriers are to polyester being a circular material.

2: I guess oil price. For us, viscose is or viscose or lyocell like cellulose, there is already have an environmental positive impact producing recycled or viscose or lyocell with recycled content. It feels more straightforward. We can get a higher price, it's a higher quality, but recycled polyester, if it's textile polyester, you need to compete both with recycled polyester from bottles which is very cheap and explaining to the customer that this is more expensive since it comes from textiles, it's just too complicated, they won't understand.

It's already so much that are complicated and technical terms in this that need to be explained to the customers. Why is this expensive, why it's not? Then you also have at least right now the very low oil price pressing the business. For that oil price and plastics and this plastic panic would be the main barriers. Price and plastic.

1: Are those the main barriers as well for your organization actually going forwards with exploring the polyester side of the business?

2: Yes, also from a technical-- I'm a nerd, I'm a technical nerd. From a technical side, I'm not-- This question always comes from a life cycle specialist and so on because it looks good in their analysis, but I'm not sure that-- It would require that we couldn't use as much of our current factory as we are right now in terms of recycling systems, and I'm not sure that it from an energy perspective, would be worthwhile to do it. That would also go into greenwashing for me. That's hard because, for me, greenwashing can be over-exaggerating something. It's not necessary to take that step. Not in this process, I'd say.

I would say if we want to be more sustainable, I think it would be better to work with higher cotton percentages so that we don't burn that much polyester. That would be more sustainable than trying to recycle the polyester. If we see business opportunity that we could do it if we manage to find some easy way to do it, then maybe it would be a future possibility, but it long ahead.

1: I can see. I think that makes perfect sense to me because your company obviously has a particular infrastructure which is for cellulose. Would the polyester be potentially useful to someone who has more of a polyester-oriented process? Could you potentially have a--?

2: The problem is that we can't really take that stream out in a way that it would be useful today. That's kind of where we're at. We can't make use of it. No one else could either. If anyone could, it would be awesome.

It's incorporated in systems that we have different lines, we call them in different-- We produce paper pulp then we produce this dissolving pulp and these used textiles, we have three different production lines and they're all connected together. Some of the chemicals, they flow in-between. It's hard to take out chemicals from just one of the lines to production lines to use in a specific purpose.

1: I see, at the moment, it just doesn't make any sense to disrupt the whole system.

2: Not from an efficiency point of view.

1: That's interesting. I guess as well, this making it into an industrial process at scale gives you a completely different perspective on what's potential and the possibilities, would you say?

2: Yes, we have the goal of in a few years going to 25,000 tons of textiles. It gives you very much new problems.

[laughter]

Like analysis and so on.

1: I imagine that. In fact, that means I can only imagine but the kinds of-- You must be working with engineers and all machinery specialists and all sorts of multidisciplinary team that aims just to scale up that. It's really interesting. In terms of opportunities, as far as--

2: That's also why it's so good to be working with a pulp company because I work at the innovation group or innovation part of the company, and we go out to our factory and say, "Hey, we have this idea. We want to build this factory." They're like, "Okay." They just take it on as any other mission that they had. It's just business as usual for them. It's like it's just pipes and pumps. It's not complicated. They've done it 1,000 times before. It's not something new. For me, I couldn't build the factory, but for him, it's just production control, health, and security for those operating it.

It just comes with the way, they just continue. It's not something-- They're like, "This is just another project, so what, it's a different material? We don't care about the materials." I care about the material. [crosstalk]

1: Can we get them to think about polyester? There you go. Here, here's some polyester now deal with it. Okay, in terms of opportunities for synthetics, what do you think if you take off your [redacted] hat, what do you think are the opportunities for circular synthetics and specifically, polyester in the next 10 years?

2: If the goal is to start to have a circular textile to textile recycling of polyester, I feel I'm not really updated on what happened in polyester, not since I left university, I've been so focused on the cellulosic part. As I said before, I think the main areas would be what I mentioned that polyester is so cheap. I don't know if there is a premium segment but compared to cellulose, which is very much premium segment, there are specific brands aiming only at producing better viscose and better lyocell, but premium and sustainable polyester, I feel like the market is all taken up by the recycling bottle polyester and explaining why that is bad, but we have this other product, which is really good.

1: Okay. Is that based on your experience of talking to brands in [redacted] or--

2: I would say that it's based on what I hear. We hear a lot about greenwashing and then sometimes I feel like some talk about greenwashing can be so unfair. As I worked so much and then someone comes and says, "Well, all work on recycling textiles, it's just greenwashing," and you're like, "I just put eight years of my life to this [inaudible 00:31:41]."

[chuckling]

1: Do you think that it's because of a lack of real understanding or--
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2: For some reason, it could be used in that way, so if this needs to be wrong, but it doesn't always have to be wrong, I think that there are always two sides to it. I see that would be a problem of this premium segment of polyester lacking, I can't really see, but I don't know if there is such a premium segment of premium sustainable polyester, that you could reach into it, because that price would be a problem depending on the processes. As far as I know, you can't re-melt polyester. Everyone that claimed that you can and have been forced to back on those kinds of statements.

1: Sorry, what do you mean by that?

2: If you could just re-melt, you just take a polyester shirt and just put it in fewer polyester pallets and make new polyester fibers and that doesn't--

1: Okay. You mean the mechanical remounts process doesn't actually work for textiles?

2: Yes. I haven't seen any, but I've seen many claiming that it would work and then they'll be on the other hand claiming that the process that I used to work with because when I used that to work at [redacted], my process did involve splitting the polyester off into this building blocks called the monomers. Then the aim was that in that process, which this part of process is inspired by, those blocks couldn't be used for re-polymerizing the polyester. Then I always got the criticism that it's so energy-expensive to break it down, to build it up, and I said that we need purity and high quality. I don't believe in low-quality-recycled products, It needs to be high quality because it will be so expensive that it would be premium and you can't sell anything premium with low quality. That just doesn't work.

1: That's interesting.

2: I would say that it's the premium segment, that the willingness to pay for, lacking. That would be my guess, but since I'm not the brand, so--

1: No. That's really, really useful perspective and insight onto it. From your experience, looking at blends and looking at pulp polyesters in the past, do you think the opportunity is more in 100% polyester or in blends? Or both?

2: Both. Depending on the companies and the ideas. The cotton-polyester blend is a very good blend for mechanical protective. They have these specific similarities, which is very good to use, easy to take advantage of as chemists, that is one reason to why everyone is working with it. Also, that it's a very big part of the material.

1: Sorry, could you explain that again? The materials used in the blends tend to be--

2: The materials, they have different kind of susceptibilities to different chemicals. They're easy to separate from a number of different perspectives.

1: Okay. I understand.

2: They're both easy to recycle. I don't believe in blends with nylon or most of all, not with elastane, because elastane is impossible to break down with anything.

1: What is it anyway? Some kind of alien substance. Yes, That's what we hear.

2: Stuff that break down everything else as well and you can always burn everything and use the gases to make something that you can do without the state as well, but--

1: It's really a lot going for it. That just reminds me actually, because elastane is something which is very high, talked about a lot. The other thing that's talked about a lot is the hardware that you get with clothing. I'm just wondering from the operations that you've been dealing with, is that been an issue? The zips and fasteners and--

2: I talk from [redacted] perspective now and what I've seen that, for example, recyclers [redacted], do you--?

1: Yes.

2: They have processes to remove zippers and buttons because they're heavy and fabric is not heavy, so you basically rip it up and then you have like the holes and they just forced out and they have running processes which have been running for like 40, 50 years doing this. For me, that is not the problem. I can't say that, but what I am a little bit worried about is linings and all these other textile materials when-- I don't know what that's called in English, what would you call I assume like on my own at home, but if you've made a lining that you do this pressing over hot glue that--

1: Oh yes. I know what you-- wonder web.

2: Yes. In shirts to make it stiff and, that's kind of glue. Those kinds of things I'm a bit worried about because they're not on the tag because then it says on the hat of the garment, and that could be nylon in a 100% cotton garment. I'm more worried about that. I would say that there are a lot of things that doesn't come up.

1: Yes. The information about what's inside a garment is something which needs to be improved, isn't it?

2: Yes. There are a lot of tagging projects and there's been a lot in that but that is needed for real recycling. I think that tagging is an absolute must.

1: Okay. That's really interesting. Okay. I'm just going to quickly ask you-- well, we've been asking this of everyone because it's just come at the right time. You might as well ask it, but I just wonder if you've got anything to say about how the pandemic has affected your research and your scaling up.

2: Our company, we produce a lot of pulp for a tissue, so it may haven't taken a lot of damage and we continue at the same pace.

You never know. That's what everyone says, that you never know what's going to happen, but going back that it will actually enhance and make the green transition even faster. Maybe. I don't know.

When everything goes back to normal as it always does, you're surprised, you're just as surprised as we were in March when everything suddenly completely changed. I think that maybe we're just as surprised in 2021 fall sometime and you're like, it's just back to normal. Maybe for businesses, we will see a more green transition, but you get a bit more time to read also that because everything is not continuing in the same pace, you get like a [gasps].

1: Chance to reflect almost.

2: Yes. Also for companies maybe, but it's very hard to say. Currently the oil price, the buying oil price is very pressing for viscose industry because oil price affects polyester fiber

prices and that presses on the viscose fiber prices. That goes back to us that we don't get paid as much for our pulp, but our company haven't stopped any of the development.

1: I guess it helps that you've got that longer-term view as well, doesn't it?

2: Yes. We would never react to anything with that short-term. When it's determined that we're going to do a process, we do it for 10 years and then we see what happens, stopped. Small things like pandemics doesn't--

[laughter]

1: It must be so nice. I'm just going to move on. This next section may feel, it may not work so well from your perspective, but we'll see how it goes and we don't need to take very long over it if it's not really making a whole lot of sense. I'm just going to post the link into the chat on here and then you should be able to click through to these Google Slides.

2: Yes, I can see them.

1: Perfect. What we've got here are a pair of running leggings which are 100% polyester, may contain some elastane and fleece zipped jumper or sweater. What we've been asking people is, from their perspective, what happens to these garments now with it from the perspective of where you are really with looking at these garments? I guess potentially from your perspective, it might be more from the point of view of supplying potentially at some point in the future, supplying polyester feedstock for these. You mentioned about a bottle to fiber. I'm just wondering if there's anything that you would say about the life cycle of these garments from your perspective.

2: I don't really know what to answer there actually. From [redacted] perspective, we cannot use those garments.

1: No, they don't really feature in your work at all, do they?

2: No, they don't.

1: I might just note down that if they were bland, the polyester would be incinerated.

2: Something that we do maybe that I would to maybe highlight this instead of using this elastane, we encourage using this EME, elastomultiester, which is a--

1: What was it called, EME?

2: EME, elastomultiester. It has one million names, it's the same thing as Sorona and the company Lycra, they also have some fiber that I don't remember name of, but it's the same thing. Sorona from DuPont.

1: And Lycra?

2: Lycra also has a fiber.

1: Is that derived from corn or?

2: It's similar to polyester. For you, it would be-- It's very small chemical changes from--

1: Does it come from corn or something like that?

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2: I think Sorona is 100% bio-based, but it doesn't have to be, it could be. I don't think that Lycra.

1: It can be processed in the same way as polyester? It doesn't have that--

2: Yes, that could be. We don't care about it at all. It is elastic, that's the kind of thing. You have to use- and if you use high percent elastane, you have to lift 20% of this one and it's expensive.

1: That's what I've heard.

2: The company that we work with, some of the companies that we work with in the service sector, they only use this because they say elastane is just too pure durability, for workwear. The workwear that we used to work with, or the workwear companies that we have work with, they only use this EME, even before we said we didn't introduce EME, they were like, "We ask you have any elastane?", and they were like, "No, we don't."

1: What was the motivation to do so, for them using EME?

2: The service companies, they own the clothes and they rent them out for the hospitals and so on and elastane has too low durability. It can't be washed that many times.

1: That's really interesting.

2: We all know that things with elastane, has very low durability, maybe for private use. I guess that this would be too complicated, it's so hard to communicate this to customers. I think it would be hard maybe to sell for, I guess, Levi's or something. Even the company that we work with, which they have a textile engineering degree and work on a service textile company, they say that EME is a kind of elastane. To me, that is saying that apple is a kind of pear. They don't even know and it's like they're experts, they don't really understand. I have to read what's on their labels to understand what they're saying.

1: That's interesting, that's really interesting.

2: [unintelligible 00:47:43]

1: It's an amazing point actually and I'm glad I persevered with this format too because of those insights that don't really come out unless we have something specific context to work on. Just we'll move on to slide two and this is really about what could happen in the future, in an idyllic way in a sense. From your point of view, what would be the most ideal solution to the polyester side of the process that you--

2: I think maybe separating out, for that's inspired by what I've been working with before, but having some post, if they can separate out the color and all other additives which you don't want there. Color and different additives and then get out the monomers, the building blocks in separate stream set in a way that you can use it again. It doesn't have to be separate streams, but in that you can get out the monomers in some way, that you can [inaudible 00:49:08] processing polyester. I know that there are people working with this.

To do that, even though it contains elastane, I think it's mainly economical barriers and that's what I said that I don't think there's a previous segment for it. I don't think there are technical barriers, I don't know, technical barriers could be overcome with just putting a little bit more money.

1: Like premium market for fiber to fiber polyester? Elastane is the other thing, isn't it? EME replacement for elastane becomes mainstream.

2: Here EME could possibly be a problem because EME would maybe make the other polyester monomers because you can maybe mix them up.

1: I'll put a question mark at the end because maybe that's not resolved in terms of--

2: I don't know that. Basically, it's you have this ring structure in polyester and then you have something in between the ring structure, which is called atoms. What's changed is the number of coal atoms. I don't know if you suddenly have in the normal polyester you would have three and in these other you have five and seven. If you just suddenly get a mix where you don't know if you have three or five or seven, I don't know what that would do with your own polyester. Maybe they could have all that, but it wouldn't be as pure.

1: Oh, you mean so when they dissolve it would or they-- I see what you mean.

2: When they try to choose to produce the new polymer, maybe it would be like impurity, but I don't really know.

1: Well, that's a question for them.

2: That process we would definitely but they still said we just wait.

1: What was the other thing that I was going to-- That's what I was going to say maybe stretchy clothes will just not be fashionable anymore? [laugh]

2: I think it won't. When I started in the suffrage fashion, I realized that even my father-in-law, who doesn't care about clothes at all, he uses elastane in his jeans because it's just more comfortable.

1: More comfortable, yes.

2: That was like, okay, we've lost this game.

[laughter]

1: Oh, that's funny. Then maybe there's something around labeling do you think?

2: Definitely that you know what's in there, tagging would be extremely important. RFID or something else. Some kind of tag as well.

1: That's interesting. Anything else that's important? Sorry, under the tag there.

2: Logistics change needs to be built up. That would also that there is like a logistics network too.

1: Do you mean specifically moving material from one place to another or are there other intricacies there that--?

2: That there is like a market at all for buying and selling old textiles which doesn't really exist today. It's hard just for us just to know and to profit.

1: That's fine. I was selling used textiles.

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2: Because today that market is only based on for second hand. You can buy from [redacted] you can buy 100 feet or so brown Manchester Jeans, or brown corduroy jeans but you can't just be saying that you want the specifications we have, they don't have in their business.

1: Specification-based?

2: Yes. Also, the whole logistics network, if that exists without it. If this increases, I think it will happen naturally because that's what happened with old paper and like metal and so on. I think that will organically happen.

1: Yes once there's an economic or business case for it, isn't it?

2: Yes

1: Okay, perfect. Just on slide three is the final thing on this is just this is looking at the next five to 10 years what needs to happen. It's elaborating on what we just talked about, but I guess highlighting more who if there's anyone specifically who needs to be involved.

2: I would say that these EPR systems are very important for us and that we get some free bonus for us because building up new processes is very expensive even though they use our existing preference. Policy instruments I think would be very important.

1: Is that on the Horizon in Sweden?

2: What?

1: Is that on the Horizon in Sweden?

2: Yes they're investigating it right now. It should be done this year I guess that as everything else will be postponed due to this pandemic. At least it should be the first investigation should be done in December.

1: Anything else? There's that kind of the main, economic side of things how to?

2: Then the other side is tagging and or analysis but I have from a chemical or a technical perspective I think that's tagging or automatic sorting is just needed and if you do that with tagging or analysis, I don't know, but this manual sorting is just too expensive.

1: No, doesn't pick up the--

2: Yes. It's not good enough. It's not just that it is expensive and it's not, it's just you can't feel and see what we want to see.

1: I get that material content for specifications.

2: That there's a market for little technical specifications if that makes sense that are not based on fashion or-

1: Or feel, or touches. Interesting isn't it because that you can't you need that kind of codified information. Anything else that you'd like to add? Are there any other any partnerships that's what you think would benefit an organization like Sedra in terms of polyester or is that just too far ahead?

2: I don't think I can share my thoughts there.

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1: That's fine.

2: I think it would be, no.

1: That's fine. Just lastly, moving on to the fourth slide just has some definitions that we've been working on and we're just sharing these with people that we're interviewing to see if there's anything that strikes them as not being right or could be different or anything that's missing?

[pause 00:58:20]

2: I think the word waste is hard, because to me it doesn't say anything. I would call it post-consumer or something. It's hard because if you only cover the pre-consumer as well, but I think waste, it's hard.

1: What word would you use within the context of where you work?

2: Actually I'm working within the [redacted]. We're developing a standard right now for terms within recycling of textiles and developing a term standard for these things. I don't remember what we agreed here. There are many members from like old [redacted] working on it now.

1: Is that something that you could share with me after the call, or is it still sensitive?

2: It's not sensitive. We're right now in what's called this specifically or this standardization is very complicated business. I'm just starting to learn it and we're right now in the ballot to get it accepted as ISO Technical Committee. I think today or something, but I think I can share something with you. I can try to find something.

1: Thank you. That would be really great.

2: Because we want to make it an international standard because we definitely need this kind of terms to know what we are talking about.

1: That's brilliant, that would be so interesting. Anything else that stands out?

2: Sorry, I get stuck there the first one.

1: It's okay.

[pause 01:00:37]

2: I think, to me, it's too narrow and also unconcise to be considered circular. The fiber minimizes negative social and environmental impacts what means minimizes. We use a lot of this, what's called best available practice that you compare to that. That's a EU BAT standard that the EU BAT says that the BAT says that. The BAT is this kind of method or this kind of technology and then you compare it to this. For example, that's what the viscose industry say in terms of the different systems they use for recycling their chemicals and so on.

They say the Chinese viscose producers have started saying that we follow the EU BAT standards and then if they do it, it's hard to know. I would say if you want something like that, but to me, the circularity is more important, and then I would lay it as a layer above if it's actually sustainable to make the circular, but it could be circular without being sustainable. I wouldn't mess it up.

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1: I see what you mean, you're adding too much in.

2: Yes, because if you just look at the term, it's circular synthetic fibers and it's quickly circular. Then I would be saying from that, it should be circular, sustainable, synthetic fibers, then I could agree on the definition but as it's written right now, it's just circular. And then it's just circular. That would be my perspective on it. Potential too in the system.

The same kind of the last one. This has to do with this, what you call open loop and closed loop. Some say that if not even the aluminum can is a closed-loop because everything has to be recycled and the print on the outside or something like that can't be recycled and then not even that is closed loop. It gets down to these details that I don't really like. It gets messy and cloggy.

1: Sorry, which specific part we are you referring to?

2: This potential to become the feedstock for further equal or higher value processing.

1: You feel that it's possible for it to be circular, even when it reduces it?

2: No, maybe not. That is so hard. No, maybe that is good because the potential to become the further... No, I think, no, the end is good. It's just-- I think it's good that you're not-- No, I think I changed my mind, it's good. It's goo that you don't say, for example, open-loop or closed-loop because that is.

1: I think that's probably we're trying to accept that it might be that the structure of the material flows may not be one way or another. It may be in lots of different cases, quite different.

2: Also, the problem is that, from a sustainability point of view or efficiency point of view, material efficiency, it's not always the best use to use it. For me as a technician, it's always the-- It should be used so that the material is being used in the best way, not in the most circular way. Do you understand? The most circular way is not always the best way. The material you get out. It might get a higher efficiency, lower energy dependence if it goes into use in a different--

1: You mean from an LCA perspective, that is--?

2: Yes, but that is hard to follow in an LCA, but if you look at it as substitution, something that you also substitute, maybe you could substitute as much as possible. The example that is obvious to me is that we put in either dissolving pulp or now, cellulose from cotton. We put into our viscose production. When our customers they produce a viscose fabric and that viscose fabric is actually very different from our goal material, so we could develop processes to take it back. But I know from a technical perspective that a lot of it would be broken down from the chemistry. That would also go out the same way as the polyester. Instead, reusing viscose as something else, MCC or there are other ways that it could be used where more of the material would be used. It's so technically hard to explain because it feels good that you use it again in the same process, that you could use it again and again and again, but from a technical perspective, I'm not sure that that is always the best. Then you get into the feelings.

1: Do you think that that's quite a significant difference between celluloses and polyester? I'm obviously not a technical person, but my understanding is that it's easier to return polyester to its original--

2: For example, it's like this, if you take out the polyester monomers, and if you actually get them out, maybe they're not completely pure, and to make textiles you need very high purity polymers. Maybe you could use those for producing bottles. Then you don't have to use the oil to make new bottles, making the best out of it.

1: I'll definitely have a think about that.

2: The monomers, they don't care if they become a bottle or [inaudible 01:08:20]. They should just be used in-- They will still be substituting as much oil as possible. [inaudible 01:08:31] in textiles.

1: I was always led to believe that the polyester used in bottles was higher in terms of properties, high costs.

2: It's higher in terms of molecular weight but I don't think impurity but... It's different.

1: That's interesting.

2: I think it's important to use it where you substitute as much your natural materials as possible

1: Thank you for that feedback.

2: That's not necessarily in the same product-

1: Product category?

2: -as it came from.

1: I guess it's more difficult to define equal or higher value when you're talking about crossing material from one product category to another. That's something that will be quite interesting to look at.

2: It's so easy to show. I love the intuition about you get out what you put it in again, it looks so nice but most technicians that I talk to, they agree with me that you should use it where you substitute as much material as possible. The problem with doing that is that then you-- Someone comes and says that you do greenwashing because it's not bulk, that circularity is the best but for me, that's just feelings.

1: Yes.

2: It's not numbers. I want the numbers

1: It's really interesting. It's very interesting different ways of looking at it. That's giving me loads to think about. Thank you.

[laughter]

2: Then the second one [silence] I think the last-- The construction is appropriate for future sorting. That might be important. This sentence in the second definition that it minimizes negative social environmental impacts. I think for me that is the definition of a sustainable fiber.

1: I'm going to highlight those ones in each sentence so that I remember that that was the primary-

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2: Because that's the definition of a sustainable fiber, not a circular fiber. What's the difference between the second and the third--? Oh, it's a garment and the textile.

1: Yes. I don't know. There's a lot of similarities. It's just there's different levels. There are some things-

2: It's the fiber and the garments. Okay.

[pause 01:11:35]

1: I think this could be interesting to explore-

2: I would say instead of using waste feedstocks, I would say that it's maybe something with that it's not from new material. Non-virgin. Instead of saying waste, I would say non-virgin because then you get-- Note therein actually first sentence. I would say non-virgin materials because that includes post-consumer and pre-consumer. The most important is that it's non-virgin.

1: Fantastic. I'm just highlighting new fibers because from what I'm getting from you is that its potential to not be so specific about the type of material that comes [crosstalk]

2: From my perspective, the substitution of virgin oil is the most important.

1: Okay, perfect.

2: Or in my area, the substitution of virgin cotton or virgin trees or virgin food or whatever it is. Virgin, that is substitution of virgin. That it creates a product where it can substitute virgin materials. That's to me the most important.

1: Perfect. That makes perfect sense. Thank you. It's really nice to have some input because quite a lot of people are just like, "Yes, looks all right to me." It's nice to have some real insight into that.

2: I've worked a few years with this.

[laughter]

1: That's great. Thank you very much. Is there anything else you'd like to add before we close the interview?

2: No. I think that's--

1: Oh. Thank you so much for all of your insights and your perspectives. It really interesting I would say. A very different viewpoint sounds really nice. I hope you enjoy the rest of your day.

2: I just want to add that this [redacted] project was so good. Just that week that you contacted me or [redacted]. I think I had contact in my work with two other [redacted] colleagues from completely different areas. I feel that in my current work I have a lot of use not only with the contacts but also with the knowledge and understanding I have from the designer perspective, the EPR perspective. We really worked a lot with explaining our different areas to each other. I think that knowledge that we all gained an understanding of the different process and different problems in different areas was so important for everyone.

1: So nice to hear. I think I agree because I worked on [redacted] I suspect it's a similar thing that you get such a diverse range of experts working together. It's incredible. The insights that you gain on trying to understand someone else's viewpoint. That was lovely.

2: Great.

1: Thank you.

[01:15:37] [END]