The Future of Supply Chain: Episode 156 - In Control at 30,000 Feet: How Lufthansa Technik Manages Global Supply Chain Risk

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Sin: Hello, everyone. My name is Sin To and this is the Future of Supply Chain, a podcast where we discuss hot topics, best practices, and the latest innovations in today's global supply chain. And today we have a premier, as I'm joined by my wonderful co-host Öykü. Öykü, our first podcast together. This is so exciting, and with that, I'm just handing over to you, Öykü.

Oyku: Thank you, Sin. Hello everyone. I'm Öykü Ilgar, a marketer, blogger and podcaster in the ERP and Supply Chain area at SAP. When we talk about digitalization, we often think of apps or AI, but one of the most critical challenges in aviation happens behind the scenes, the supply chain.[00:01:00]

So today we explore how Lufthansa Technik runs one of the world's most complex spare parts and logistic networks and how data technology and smart business decisions keep aircraft in the air.

To do so, we have Lena Kaehler from Lufthansa. Lena, great to have you on the show. Before we start, could you please introduce yourself and your company?

Lena: Thanks for having me today. Really excited to share some of the insights of this industry I really love by heart since 20 years. My name is Lena Kaehler. I'm the Senior Director for Component Logistic Transportation and Sales in subsidiary of Lufthansa Technik, which is called Lufthansa Technik Logistics Services. With my team, I'm responsible as my long title says, for the Worldwide Transportation Network, as well as for the account management and sales for most of our customers, including one of the biggest business segments of Lufthansa Technik, the components of spare parts segment.

And I love [00:02:00] that job because the industry is so international. We connect people around the world, more on the positive collaboration spirit. So that's really what I love. And as Lufthansa Technik Logistic Services, we are a hundred percent daughter company of the Lufthansa group and only and fully dedicated to aviation logistics. So we move, store, all parts which you need to repair an airplane from a small, bolt or nuts up to flight management computers or the coffee makers up to engines and landing gears.

Oyku: Great. Lena, managing spare parts at cross globe sounds incredibly complex, especially when you are in such a big company. So what are the biggest challenges of managing your logistics processes for spare parts?

Lena: Well, good question. I would come from the specifics of the industry and the business, right? And I would see three major challenges. The one thing is we are a highly regulated business because all of us want [00:03:00] to fly safely. We deal with material of a very high value and we deal with material of all types, of which makes logistics more challenging and more fun.

So perhaps, let me outline that a little bit. The highly regulated business is not only for aviation, meaning it's regulated how much a pilot is allowed to fly or how a mechanic should install the part in the airplane, but also how material has to be stored, what to be considered when it's moved or packed.

That is highly regulated and we are audited by authorities, internal and by customers regularly. This means also we are a little bit risk averse in our company as well as in our industry, and I think that's good, at least from a safety perspective. But we have a good open failure culture, so we learn from any incident.

And logistic wise, the regulations also interesting when it comes to the physical logistics because most [00:04:00] parts we ship are used directly at an airport and we all know you cannot just walk on the apron. That means we need to ensure everybody we deal with has access to the air site of the airport.

From a material perspective, the material has always a very high value. So an average coffee maker in the kitchen of the airplane where all of us enjoy during flying, perhaps having a zip is the value of roughly a five digit amount of Euros.

Oyku: Wow.

Lena: Exactly. So then of course you consider a little bit more, oh, I not just buy another coffee maker to store it somewhere else, right? You really consider

thoroughly; do I need the next one? And you repair it instead of just, or scrap it when it's broken. And when you talk about flight management, computers, all that you deal with, six digit amount of parts, of value easily.

That means for us in logistics that [00:05:00] speed is king. Speed and reliability, stability. So, it's definitely, of course we need to be cost competitive for what we deliver, but for the overall supply chain in aviation logistics, you only do fast and very fast.

And when we talk about the type of material we are dealing with there are of course smaller parts which are easier up to engines on a cell parts, which sometimes only fit in one aircraft freighter type. So, you really need to know where to fly it, how to add it with some trucking into the aviation hubs, things like that.

The other dimensions, which make it interesting is of course, dangerous goods, right? I think in many industries. But we really deal with all types of dangerous goods, more than classical ones, but also explosives. And even we have some parts which have radioactive portions. So that's what we need to deal with also from a safety perspective.

And last but not least in aviation we [00:06:00] have a lot of dual use goods. So, material you can use in commercial planes, but also in military planes. And for these you need special licenses. You need to ensure in which countries you are allowed to ship these parts. Things like that need to be considered in our network.

Sin: Wow, this is very impressive. Lena, as you said, you are managing spare parts for aircraft all around the world. Some you al already named and as you fly those spare parts around the world with a lot of destinations and maybe thousands of aircraft in operation and a massive number of daily transactions.

Could you describe the sheer volume of the logistics involved in running Lufthansa Technik spare parts management?

Lena: Of course, I'm happy to do so. Perhaps starting with a little bit of background, because we are called Lufthansa Technik, but we deal and serve airlines around the world, [00:07:00] far beyond the Lufthansa group. So we are having customers around the globe, roughly 800 different airlines. And roughly one out of six airplanes in the commercial world fly with parts repaired by Lufthansa Technik or provided by Lufthansa Technik.

So that means just to give you a dimension about what we are dealing with. It's not only shipping parts to our main hubs in Hamburg, Frankfurt, Vienna, or something. The other portion is due to the high value of the parts, et cetera we don't do a lot of consolidation because it's always more cost effective to ship the part only then when you really need it because of the high value to not have somewhere overstock or something like that.

That means that we have overall roughly 1 million shipments a year around the globe and what you mentioned already Sin, this is a very diverse network. Of course, we have, I would call it highways or [00:08:00] runways, right? Germany to the US in our industry or our shops in Hamburg to our main hubs in Frankfurt or Zürich, but we have also far smaller lanes. We need in the end to serve all the maintenance locations of these 800 airlines if it comes to the demand.

And that means that we have in a year on average 1000 origins where we start, a transport or a shipment, and roughly 2000 where a shipment can end. So it's really a diverse network, and as I said, we have the high runways or highways where the big majority of parts floats, but in the end, the unexpected can happen.

So, for instance, I think none of our customers has a maintenance station in Ruanda, in Angola. But some time ago there was a technical defect identified on a flight to Southern Africa. The flight was for security reasons, diverted [00:09:00] to Angola. Someone needs to ship the material to make the repair in the end.

And also, as I said, to ensure that we not only import the part correctly, but also bring it to the air, to the mechanic in the hands of the mechanic air site at the airport. So that's a little bit the fun of our business and of course all that 24/7/365 days a year because every minute there is an airplane somewhere in the world flying and somewhere needing maintenance.

Oyku: Yes. You said 1 million, right? I didn't meet. That's crazy. And it sounds like a balance act between operational necessity and cost efficiency, managing all of this. So how do you decide what to keep in stock? How much and where to keep all of that spare parts?

Lena: Exactly. And I would focus really on this spare part business and perhaps explaining it a little bit because we call it a material pooling. So we share this stock [00:10:00] with all these 800 airlines. They buy in the end an insurance

product from us. So, when their flight management computer gets a damage or a defect, then they order from us a new one and sent back their part for repair.

We repair their part, and then we put it into our warehouse for the next demand from any customer around the world. So that is that we really share this high value material. And just to give you a dimension, LHT only for that portion of our business, we own a material pool of approximately the value of 2.3 billion US Dollar.

Although we are really carefully considering what to buy because of the value. So how do we decide that? And also, how do we decide to put it where. We have an own developed material planning system for only that portion of our business. And there [00:11:00] of course, we consider all the relevant parameters, which is of course the first and easy part.

Which of our customers is flying that technology in which of their airplanes and how much are they flying? Then we know from historical data, of course, how frequently the part normally needs to be changed because it's damaged or having a defect. Then the question is how critical is such a defect for the airplane?

Coffee maker is more emotionally for the guest, but not security relevant. Some other parts you need to replace immediately, and therefore we need to store them closer to our customers. And then one of the most important input parameters is how long is one turnaround of the material in the total material cycle?

So how long does it take from the customer to shoot it back to us? We bring it into the shop either here in Hamburg, in our main facility, or around the world, or even to suppliers. [00:12:00] How long does it take to come back and then to bring it into the next warehouse or to the right warehouse?

And these are, of course in short main factors and criteria we involve in our calculation and then the system with all its statistics and nowadays also more and more AI does the magic to give us a recommendation which parts to store where. And then we still have human beings, especially for the most expensive parts to take the final decision. All that of course as well. But that's the basic.

Sin: As you just said, you deal with a high volume and complexity. And then also speed and liability is the king, as you said at the beginning, and which is super important for your business. But there are also other factors that you need

to consider while transporting or to fly one part from one destination to another destination.

So, that are borders. And, a global supply chain does not just stop at the national boundaries, [00:13:00] as you described in your examples, but quite the opposite. So, with all the cross-border movement of goods, how do you address challenges such as tariffs, which is well kind of big in the news, customs, countries and specific regulations, and et cetera?

Lena: Yeah, good question. And as you said, unfortunately very much in the focus in the last, I would say good 12 months, right? Definitely these are important topics for us.

Perhaps to start with a little bit of background overall, historically, aviation was in the lucky situation that for different countries, but even agreements from the World Trade Organization, there were special exemptions for certain tariffs for aviation parts.

So, with that, of course, with such an international business, tariffs and especially also other trade regulations, export compliance, things like that are very important in our business. But there were also parts where we could fairly [00:14:00] easily move and without too much of interference. And this has to a certain extent changed in the last year, obviously with the tariffs especially increased and implemented from the US with a discussion about potential counter tariffs from the European Union.

And I'm sure I'm not telling a secret that is a big commercial risk for us as an industry as well as for Lufthansa Technik. So, the good thing is, coming back to the basics of our industry, we have a strong fundament of processes and data because we are such a regulated industry, right?

Nevertheless, we learned that we need to adapt some of these processes. We need to bring the data together to ensure that we apply the right customs and tariff programs with the new regulations. So, things like that. So, we definitely had some homework to do and constantly [00:15:00] have.

On the other side, of course we adapted our supply chains. So, of course we looked into which parts really need to cross the border because the business case might have changed. So, what perhaps in the past it was more economical for us from a European customer or from our pool stock here in Frankfurt to send a part for repair into the US. And ship it back because that repair station is perhaps a little bit cheaper than the European competitor or even our own shop,

or we don't have the capacity in our own shop. Then of course, if you have to apply a certain amount of tariffs, this business case can turn. So that is what we looked into.

And the other way, the same you ask customers, do they really need to ship material into Europe? What can we avoid there? Nevertheless, in our industry with where for many of these parts in our pool, or in our stock, what I explained before, we have only one or two or three [00:16:00] parts of a certain technology, and we have customers all around the world.

So, you cannot completely avoid or bring to a complete low level the number of border crossings. So that's why we have to deal with it, and that's what I said, definitely good training. How flexible we can adapt our processes, how good we can link our data. And honestly last year for Lufthansa Technik with that dimension of the commercial impact, we implemented a classical crisis management structure.

Our industry has fairly good standards on that because there is always the worst case scenario possible. And that is why we have clear crisis structures, how to implement on which management level, with which accountabilities, et cetera. And that is what we used. And also that is helping us in such situations to ensure that we redirect project resources, experts from the different processes to that dealing with these topics.

And overall, we see that it's still a volatile [00:17:00] environment, so we still see uncertainty is what will happen in a few weeks. And that is where we still are in regular check on, do we need to adapt anything further?

Oyku: Mm-hmm.

Sin: A following question, because you mentioned data and processes, that you have a good fundament of this. And before that you also mentioned, AI and the new technology. How are you implementing AI to build or to use those data, to optimize the processes and also to get your crisis structure maybe a little more efficient, even more efficient than it is right now?

Lena: Honestly, I would say I would wish for more. So, in the material planning, I think we have first, and also in the forecasting, not all AI but I think also process mining, right? Automation, these kind of technologies we use in our in the material planning.

Of course at the moment, honestly, in the last [00:18:00] 12 months where we started to adapt. We in the beginning even went to more manual decisions because the logic and the experience we had from the past built into our system were based on other prerequisites, so on for instance, certain tax and tariff exemptions, things like that.

So that's where at some point, and also when you go beyond a certain threshold. We wanted to have the manual check is this really so urgent, that part before we have changed our processes, that we really want to import it into the US. So funnily in that crisis situation, we went to a little bit more manual work at some point. Including also data gathering manually in our sister company in India, for instance, or things like that to help us to mitigate the risk.

But overall, of course, when we now look forward, we have a big digitization program, really digitizing our core processes in Lufthansa Technik as well as with us in the [00:19:00] logistics. And there we are really looking into all the opportunities, how to integrate artificial intelligence even more into our day to day business.

Oyku: Sounds great. We haven't published a single episode without mentioning AI and aviation is one of the key industries where AI can be definitely used to improve various processes. And like you said, these spare parts are not just small spare parts, not like a only coffee machine, but we are talking about huge parts, right?

And, um, a lot of these parts and pieces equipment are repurposed, repaired, and reused. So how does this increase the volume of inventory movements and how do you manage this process?

Lena: Yeah, exactly, you're right because of the material value, right? Most of our parts are repaired, as I said. So, in a classical way when you buy something for installing it in a higher SE or when you want to sell it to a customer, then you have normally roughly two shipments. You [00:20:00] have one coming from the supplier and one either to your shop or to your customer. In our world, we always talk about a material cycle because of the high value of the parts because it's worthwhile, right? As I said, a coffee maker for whatever 20,000 bucks, you don't want to put into scrap just because there is a small defect or something.

So for us, it means the customer sends a part to us when it's damaged. Then we send it into the repair shop that can be best case next door on the same facility, but it can be also on the other part of the world.

Then the shop hands it back to us in logistics when it's nice and shiny, polished and repaired again, and we then bring it to the warehouse. That can be also, again, on the same location, but more likely the shop sends it to the first contact or closest contact of logistics. And from there, based on the material planning [00:21:00] decision, we ship it to the location where we're going to store it.

And then at some stage, another customer requests the part and we send it again next door or next continent. So that means that we have whatever, two to three times the material movement by just one part, I would say. And as I mentioned, especially this turnaround time in this material circle is for us a high and an important factor for the inventory costs, 'cause that is defining, the faster we are circulating, the less component stock we need, and that is pure money.

Nevertheless, in the end as logistics, I don't care so much if it's the repaired part or defect part, right? Speed is always important.

Nevertheless, the supply to the customer is always the most in focus because there could be always and right in our industry, AOG - aircraft on ground, as the name [00:22:00] says. That's the most urgent situation because then we are really at risk of canceling flights or something, and that is where we need to be the fastest possible option.

Potentially up to onboard couriers, right, someone picks up the part and brings it more or less as hand luggage on a commercial passenger flight to the destination, or even chartering an airplane for delivering a part around the world.

Sin: So, as you said, time is very critical for your business and in our pre-discussion we spoke also about your day-to-day activities. So there must be one thousands of inventory movements of goods, of all shapes and sizes via many modes and transport, and some of them involving hazardous materials that you also mentioned at the beginning of our podcast.

So, how do we manage to make sure that these items will reach their final destination in time as well all [00:23:00] know that time is the most important factor here. So, if one part will not reach its destination, a chain reaction will start and maybe an airplane will end up grounded.

Lena: Exactly and in Lufthansa Technik, we love processes and structures. So I would explain you a little bit how we organize, especially the transport network, which is obviously my home turf. So in the transport network we have certain

main functions. So it starts all on a long term perspective with transport procurement.

So as LTLS, we don't own trucks or airplanes, so we buy the logistics transports from partners, from the big ones, all of us know to smaller local heroes around the world. So, that transport procurement team is providing in the end the capability of my transportation network, of our transportation network and what we can deliver when, of course, based on the requirements of our customers.[00:24:00]

And then we have a team and a role in our organization, which is dealing with the transport concepts. So out of that capability we have and the demands of our customers to explicitly decide which options we want to use for this specific customer and this specific priority on this lane for dangerous goods, for usual goods, things like that.

And that bringing it into our transport management system as rule set because we cannot decide that manually based of course. And then we have a material flow management where colleagues are really manually tracking and following up and ensuring for the most critical parts. Also, we have a real AOG-team doing the same for the real grounded airplanes.

So really, I would say babysitting the specific transport to ensure that whenever something goes wrong, we immediately react and are not awaiting until someone [00:25:00] informs us or things like that.

Also important, they have the crucial role to even faster than our usual standard systems do give transparency for our customers because our customers can deal with a lot when they know when a part will arrive, they can replan their maintenance, they can cancel and rebook the passengers, but if they don't know when part will arrive, then that's even the worst.

And that is why for the most critical parts, we have these special functions and teams around the world. We really do the, as I call it, always babysitting of transports in the very, respectful and value adding way.

And then of course the basic is also our transport management system, our processes. So we also have a team fully dedicated to managing these topics as well as I have a digitization team enrolled because honestly there is still room for improvement and we have constant development in our [00:26:00] world, right? When it comes to opportunities from AI digitization. So of course we also have a digitization program for our transport management.

And with these frameworks, then we'd have the structures to operate on a day-to-day basis that transports worldwide. And that's working fairly good in most of the cases. And then the beauty of this worldwide network is whenever something happens around the world, we might need to deal with that as well.

If it's a weather like high snow in Northern Germany, beginning of this year, if it is global politics where some air spaces are restricted for a certain time. Or if it is a strike in one of the big integrators then we always need to decide, okay, how do we now adapt our network, to ensure that the material is as fast as possible floating without too much interruptions.

Sin: So given the complexity that we heard [00:27:00] today which is super interesting, it naturally prompts us to look forward which leads me then to my next question as we are also coming towards the end of our podcast. And like Richard always loves to say that he always ask our guests the same question is what is the future of supply chain?

Lena: Very good. I look into my crystal ball. From today's perspective, the world is changing. I would say perhaps three dimensions are for me, extremely important for the future of supply chain.

The first one we tackled already, that's data, AI, so all the technology development we see, I'm sure, I'm convinced that can bring us to a complete new level of supply chain management of optimizing our stock levels around the world, optimizing transport routes, things like that. So there is definitely, we have already gained a lot of benefits out of that, but there is still far more to come.

The second thing we have also touched [00:28:00] already is. I believe that in international trade and tariff topics, aviation, especially aviation supply chain is and more affected also in the future from these kind of regulations. And we see that it's more volatile and I would expect it will stay more volatile than in the past. And we need to deal with that and ensure that we are flexible enough in our structures.

And the third thing, which we haven't touched base today, and also, it's not so much in the focus in media politics at the moment. But as a human being, I'm completely convinced, we also as a supply chain industry need to ensure how we can transform our industry to become more sustainable and CO2 neutral at some point. Talking that knowing that aviation is one of the biggest challenges for us to transition into a CO2 neutral team. Nevertheless, at least what we can

[00:29:00] influence, what we can do on our side, we are willing and we should focus on that as well.

And I think that is something which will be a requirement in the end and continued requirement for everybody in supply chain around the world as well.

Oyku: Great answer.

Sin: Yes, absolutely. Thank you so much Lena. To sum it up, we talked today about technology, so using AI for optimization and efficiency, and to be very flexible in terms of international trade tariffs. And also, even though we haven't really touched this topic today to transform, to be a more sustainable company in that way.

So, Lena, thank you so much for this great conversation. And thank you all for listening. Please mark us as a favorite and you can get regular updates and information about future episodes. Until next time, from Lena, Öykü and I thank you for discussing the Future Supply Chain.

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