IlLUminate Blog Transcript: **Zach Zacharia on Why Cybersecurity is Top Threat to Supply Chain**

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ANNOUNCER: 00:02	This podcast is brought to you by ilLUminate, the Lehigh Business blog. To learn more, please visit us at business.lehigh.edu/news.
JACK CROFT: 00:14	Welcome. I'm Jack Croft, host of the ilLUminate podcast for Lehigh University's College of Business. Today is January 11th, 2024, and we're talking with Zach Zacharia about the most significant trends in the supply chain in 2023 and the biggest threats facing the global supply chain for the first quarter of 2024, as reported in the latest Lehigh Business Supply Chain Risk Management Index. Dr. Zacharia is an associate professor of supply chain management, interim department chair of Decision and Technology Analytics or Data, and director of the Center for Supply Chain Research at Lehigh. The Lehigh Business Supply Chain Risk Management Index, or LRMI for short, was developed in 2020 by the Center for Supply Chain Research at Lehigh University and the Council of Supply Chain Management Professionals. Welcome back to the ilLUminate podcast, Zach.
ZACH ZACKARIA: 01:14	Thank you.
CROFT: 01:15	Now let's start by looking back on 2023. What were some of the most significant trends affecting the global supply chain in the year just passed?
ZACHARIA: 01:24	Well, the first trend is that the overall average risk has been much lower than years past. It's been around 65 as opposed to being almost 70 a couple of years ago, and actually reached the number of 90 in one quarter. So one of the things I want to stress is that supply chain executives are perceiving that there's less supply chain risk this past year. Another new trend is that cybersecurity for the first time became a number one risk. This happened in the second quarter of 2023, and stayed as the highest risk from then on. Now, economic risk was the number one risk for many years. And it started as the number one risk in the first quarter of 2023, but has dropped since then to the third risk in the first quarter of 2024.
CROFT: 02:18	Now, as the new year dawned, Israel's war on Hamas in Gaza continued with threats of expanding to a regional conflict, potentially. And barring any unforeseen events, Russia's war on Ukraine will mark its second anniversary in February. What effect are these wars having on the global supply chain?
ZACHARIA: 02:40	As we've discussed in the past, executives don't like uncertainty because it again adds risks. And so one of the things that is definitely visible is that the global supply chain, for the most part, has adapted to the ongoing war in the Ukraine. However, the new Israel's war on Hamas has added a lot of risk and has affected the global supply chains, especially when large container ships going from Asia to Europe typically go through the Red Sea, through the Suez Canal. Many of these ships in the last two weeks have opted to avoid the Red Sea and going around the Horn of Africa, adding about 6,000 nautical miles or about three to four weeks in terms of travel time. So this additional uncertainty is going to add cost to the supply chain. Now, the U.S. has already deployed warships. Things are fluid. There is something that came out yesterday that Maersk, one of the largest shipping companies in the world, is going to start allowing ships to go back through. But the key thing is that ship owners don't

want to risk their cargo, and they're going to be careful, which will add cost to the shipments, and in some sense, add costs to the supply chain.

CROFT: 04:01

Now, let's turn to the new Lehigh Business Supply Chain Risk Management Index report for the first quarter of 2024. And just to recap quickly, the LRMI, as we've discussed on previous podcasts, is a number between 0 and 100, where greater than 50 suggests increased risk, 50 suggests the same risk, and less than 50 suggests decreased risk. The numbers are based on ratings submitted by participating supply chain professionals on whether they felt the risk for the upcoming quarter, in this case the first quarter of 2024, compared to the risk in the fourth quarter of 2023 would likely increase, remain the same, or decrease for 10 different supply chain categories. The overall average risk heading into the first quarter of 2024 is 64.61, which is down slightly from the fourth quarter of 2023 and remains low compared to the average risk historically, as you mentioned when you were talking about the trends from last year. For example, the all-time high overall risk was 72.79 just two years ago in the first quarter of 2022. So that decrease sounds like good news. Is it?

ZACHARIA: 05:23

Absolutely. When the risk drops, it's [unintelligible] extra inventory because they don't know what's going to actually happen in terms of demand. Is the product going to get delivered in time? Overall, the supply chain becomes more efficient. Risk adds uncertainty, and uncertainty is always a problem when you're trying to manage a supply chain. So definitely this decrease is very, very, very good news. The other thing I do want to state is that it is not a linear number. So 64.61 is not just eight less than 72. It's actually a little bit of a geometric progression. So there is a very much larger decrease than just the number of eight that is between the 64.61 compared to 72.79. So clearly there has been a significant decrease in supply chain risk in just the last two years.

CROFT: 06:16

OK. Now we'll get into some of the specific risk factors. And Cybersecurity and Data Risk remains the top risk for the fourth straight quarter, as you had mentioned, as seen by the supply chain professionals who participate in the survey. And it has increased by three points from 75.34 in the fourth quarter of 2023 to 78.2 in this quarter. So what are the main concerns supply chain professionals have regarding Cybersecurity and Data Risk? And how concerned should all of us be about it holding the top spot on the risk index for a full year?

ZACHARIA: 06:56

So examples of Cybersecurity and Data Risk is cyber-attacks, data corruption, data theft, systems viruses, hardware issues, security platform controls. Clearly, cybersecurity continuing to hold the top spot is a serious issue. Large companies have spent a lot of time trying to mitigate this risk, but this risk has been increasing basically because of some of the large trends that we're seeing. First of all, there are more employees that work from home. And anytime you are in that kind of environment as opposed to a corporate environment, there is going to be additional risk because just to the way the network is set up. Second, the threats have become much, much more sophisticated. It is clear that the actual groups that are trying to attack are companies. They're not just some person sitting in a basement somewhere. These are actually groups of people who specifically are trying to steal data and trying to ransom, hold large companies ransom. And finally, the third point to note with cybersecurity is it's that employees are the most vulnerable part when it comes to cybersecurity. And it is very clear it's the phishing attacks that people send emails. I mean, just this morning, I got an email supposedly coming from UPS saying that they don't have the correct address. There's something that has been delivered that we need your address. Please click on the link below so that we can deliver this goods for you. I mean, it looks so legitimate, but this only works if the employee clicks on the link. So that's the weak part of having employees and training has to be done. But I think most companies are aware of this and they're taking this very seriously.

CROFT: 08:54

In the most recent LRMI, Customer Risk is ranked second and has also increased from the last quarter of 2023, rising four points from 67.12 to 71.79. So what does Customer Risk entail and what are the main factors driving that index up?

ZACHARIA: 09:18

Customer Risk is defined by fast-changing customer demand, easy-to-lose customer loyalty, changing customer-based demographics, hard-to-predict customer behavior, and hard-to-service customers. And I think what has become very clear is that customers are not only becoming more fickle, but they are becoming more demanding, wanting to have more customized products that meet their requirements. And so companies are having a harder time trying to predict that kind of customer behavior. And this is why Customer Risk now become second because it has become more difficult for companies to anticipate what is needed. Remember, basically the lead time that's associated with production, you have to produce the products well before someone actually comes and purchases the product. It's not instantaneous production. Therefore, companies are always trying to predict what customers want, what customers will buy. And you have to have that prediction in there. The more likely you are to know exactly what the customer wants, the easier it is to predict. The better you are going to be able to meet customer demand, customer risk will go down. But if customers constantly change, then clearly that affects the kind of risk associated with customers. And that is why customer risk has been going up.

CROFT: 10:44

Now, one of the most fascinating parts of the index I've found over the years is the comments you collect from the supply chain professionals. It's not-- I mean, the numbers are obviously significant, but some of the comments, I think, illuminate some of the issues that may not show up in just the number. And the current one in the customer risk category, one of your respondents wrote, "Still emerging from COVID, our customer models may prove to be invalid." So in what ways has COVID changed customer models? And how does it continue to disrupt the supply chain?

ZACHARIA: 11:29

Well, one of the things that COVID did, and I think that it's well documented, is that there was a group of people that really decided to choose early retirement. With the risk that was associated with coming into an office environment, coming into a factory, working with people in close proximity, many of the people decided that they didn't want to necessarily wait for retirement. So there was a real increase in vacancy rate. And that was one aspect. So there are a lot of warehousing and manufacturing jobs where they don't have people capable of doing the labor, which has affected the kind of supplies that they could actually have. A second factor that COVID caused is that there has become a bit of a dichotomy between those who can work from home and those whose jobs, it is impossible to work from home. If you are working in a warehouse, you cannot do that at home. If you're working in a factory, you cannot do that at home. So that has again affected this kind of dichotomy. I almost want to say that there's office workers versus people who are actually directly working in manufacturing or working in labor. The other thing that has happened also is that because suppliers are not able to still have job openings, they have vacancies, they've not been able to have enough workers means they've not been able to meet their demand. Some of the executives I've talked to have told us that if they could get more labor, they could produce more products. So therefore, COVID has affected the kind of supplies that you actually have. So that's also a factor.

ZACHARIA: 13:16 And the third factor is that in some fields, demand is fundamentally changed. If, for example, your business was directly related to the office occupancy-- let's say you were a restaurant in downtown Philadelphia, where you had relied on office people to come and fill your restaurant space every lunch hour, but now all of a sudden, those office workers are not there. In fact, pretty well all the companies in my Center for Supply Chain have all said to us that they have policies that mandated that people have to come into the office three days a week. Well, that's two days that they don't have to come. And that is a significant shift in the way that companies interact and the way that there has been demand. So these kinds of things have definitely affected the way you would model your customer demand because the market has changed.

CROFT: 14:10 Now, as you had mentioned, in looking at the trends from last year, Economic Risk has been at or near the top of the index since it started and still holds that all-time record you had mentioned for the highest risk at 90.72 just in the third quarter of 2022, not that long ago. So even though it checks in at number three on the First Quarter 2024 risk index, it has come down to its lowest level yet, falling below 70 for the first time to 68.83. So, again, what are the main factors that make up Economic Risk? And what are people most concerned about? But obviously, while it's still high, is there any good news in that it's now under 70, given how much time it has spent in the upper 70s, 80s, and even 90s in recent years?

ZACHARIA: 15:07 So let's start with what is meant by Economic Risk. Examples of Economic Risk are increasing energy costs, commodity price volatility, labor shortages, demand shocks, global energy shortages and border delays. All of those kinds of examples, clearly the risks associated with those things have dropped down. So the answer to your first question, yes, it is very good news that the economy is stabilizing. But the other thing to realize is that all the other risks have come down, which has been a clear effect that supply chain executives are seeing that overall risk is decreasing and Economic Risk has been a large part of that risk. And so people are being very positive or confident that the risk in the economy is decreasing.

CROFT: 16:00 Now, it would seem counterintuitive, I think, that heading into what promises to be by most accounts a rather ugly and divisive election year, Government Intervention Risk actually decreased from 71.92 last quarter to 65.58 this quarter. So what do you think that tells us?

ZACHARIA: 16:23 Looking at the definition of Government Intervention Risk, the examples are like new regulations, tariffs, trade wars, government restrictions on source materials, methodologies or technologies. So those kinds of things are long-term processes and typically are not driven by politics, which tend to be more reactionary. So the long-term functioning of the government in terms of tariffs and those restrictions take time. Now, we are seeing the effects. There are still significant tariffs, but it looks like China and the U.S. is definitely discussing reducing some of those tariffs. Now, there are still significant barriers to technology issues that the U.S. is very concerned about. And so those things are there. But those kinds of decisions and discussions really doesn't have anything to do with the divisive kind of politics that are going on in our country today.

CROFT: 17:36 Now, while Economic Risk and Government Intervention Risk decreased, the flip side of that is that Technological or Competitive Risk and Environmental Risk both increased and are now very close to Government Intervention Risk this quarter. Technological or Competitive Risk rose from 62.33 to 65.38, while Environmental Risk increased from 61.64 to 64.94. So let's look at those one at a time. What factors go into Technological or Competitive Risk? And what are the drivers there for that increasing?

ZACHARIA: 18:20 The examples of technological risk is disruptive or replacement technologies, introduction of new competitive firms and ineffective or non-existent [regulation] really, that risk has increased. There has been new technologies. And so companies are taking that into account. And all of those things has definitely increased the associated risk.

CROFT: 18:47 What are the main factors in Environmental Risk and what are the biggest threats supply chain professionals see there?

ZACHARIA: 18:54 So some examples of Environmental Risk are natural disasters, extreme weather, industrial accidents, and pandemics. Environmental Risk has increased because, I think that everyone can agree, there's been an increase in natural disasters. There's more mudslides, more wildfires, more tornadoes, more hurricanes. And so there's evidence now. And actually, there was an article that just came out recently that suggested that many large insurance companies have doubled or tripled the premiums that they are asking to providing insurance because they're seeing very, very large claims from these extreme weather-related events. And these kinds of events is only going to increase the amount of environmental risk going forward. So I do think that this is an area of risk that is going to continue to increase. And supply chain professionals are very aware of that increase.

CROFT: 19:55 Now, as we look ahead to the first quarter of 2024, are there any other trends you've spotted in the latest LRMI that we should be aware of?

ZACHARIA: 20:05 Absolutely. I think one of the things that I just started to see, and it's again related to technology, is that the role of AI, artificial intelligence, and machine learning has really sort of taken off. Now, there was a lot of hype associated with ChatGPT, and people when they started to use it realized that there are lots of problems with it. But on the other hand, there are certain advantages and certain benefits. And so definitely you can see that one of the trends that we should all be aware of is the role of AI going forward. And sure, we're very aware of this, and we're trying to encourage our students to be aware of the risks of using those kinds of things and how to use it to actually help you do a better job. And to realize that you have to be fully aware of the kinds of mistakes that ChatGPT can do and be prepared. Check what it's stating. But this is definitely something that is going to affect our economy, and it's something that all of us should be aware of going forward. Because I do think there are business benefits, and it is going to see or impact the supply chains going in the future.

CROFT: 21:24 Now, the dawning of a new year is usually a time for optimism. So as we've done in recent years on these first podcasts of the new year, let's try to close on an upbeat note if we can. And what do you see in the supply chain that gives you hope for 2024?

ZACHARIA: 21:42 Well, I think the biggest thing that I see is that there's a strong sense that the Fed have done a really good job to prevent us going into recession or into inflation. It looks like the economy is doing a soft landing, and there is a strong chance that the Fed will likely drop interest rates next year, which will again help the economy. And they seem to have tamed inflation. These are all very, very good signs. The second thing is worthwhile mentioning, is that the Inflation Reduction Act has definitely brought in a lot of investments into renewable technology, for example, like batteries, and putting new factories in place that need to be invested and need to be built here in the U.S., which has led to increasing jobs. So those kinds of opportunities are likely going to increase in the economy going forward. There's also some changes now that are happening in terms of unions. And we don't know exactly which way it's going to go, but there is definitely improvement in wages for the middle class, which, again, looks like it's going to help the economy, but it's always a fine line. Is it going to cause some businesses to go bankrupt, but another business become more successful? So overall, I'm very much more positive in believing that the economy is going to continue to grow and there's going to be a reduction in risk, which will be helpful for all of us in the long term.

CROFT: 23:12 Zach, it's always a pleasure. And thanks for being with us on ilLUminate again today.

ZACHARIA: 23:18 Thanks so much, Jack, for having me on. I always enjoy this opportunity to talk to you about the Lehigh Risk Management Index. Thank you.

CROFT: 23:27 Zach Zacharia teaches graduate and undergraduate courses in supply chain operations management and logistics and transportation. As director of the Center for Supply Chain Research at Lehigh, Zach and the faculty and students at Lehigh Business are generating new ideas for education and future knowledge in the field of supply chain management. This podcast is brought to you by ilLUminate, the Lehigh Business blog. To hear more podcasts featuring Lehigh Business thought leaders, please visit us at business.lehigh.edu/news. This is Jack Croft, host of the ilLUminate podcast. Thanks for listening.