**IlLUminate Blog Transcript:** **Lehigh Business Supply Chain Risk Management Index**

Recorded Sept. 10, 2020. [Listen to it here].

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| ANNOUNCER: 00:02 | [music] 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: 00:13 | Welcome. I'm Jack Croft, host of the ilLUminate podcast for Lehigh University's College of Business. Today is September 10th, 2020, and we are talking with Zach G. Zacharia about the new Lehigh Business Supply Chain Risk Management Index, developed by the Center for Supply Chain Research at Lehigh University and the Council of Supply Chain Management Professionals. Dr. Zacharia is an Associate Professor of Supply Chain Management and Director of the Center for Supply Chain Research at Lehigh, where he teaches graduate and undergraduate courses in supply chain operations management and logistics and transportation. Dr. Zacharia, during the COVID-19 pandemic, public awareness of what the supply chain is and the role it plays in both the US and global economy seems to have grown considerably. But for those who still may not be clear, can you tell us briefly what is the supply chain and why should we care? |
| ZACH G. ZACHARIA: 01:13 | By definition, a supply chain is all the companies that are involved in the raw material, right through manufacturing, distribution, retailing, to get to the final consumer. Now, as you know, we've had a number of shortages with things like toilet paper that has really driven the importance or the critical role that supply chain managers play in the economy in making sure the products are delivered to the right customer, the right time, and the right condition at the right cost. So even with all this growth in information technology, at the end of the day, when you want a product, someone has to make the product, and someone has to deliver the product to your door. So especially with this idea of companies that have embraced lean and reducing inventory, understanding what the supply chain is and how it works is critical to be able to get the product to the right customer in the right time as needed. |
| CROFT: 02:13 | The new Lehigh Business Supply Chain Risk Management Index, or LRMI for short, officially launched this week. What sparked the idea of creating an index that puts a number on the level of supply chain risks that businesses face in each coming quarter? |
| ZACHARIA: 02:29 | So in the supply chain industry, there are two other sort of famous indexes. For example, the Purchasing Manager Index that looks at how purchasing managers perceive what's happening in terms of the number of products they're actually going to buy every month and logistics managers that look at logistics issues. But we believe we're the first to focus in the area of supply chain risk. And there really is no index out there that'll help supply chain managers identify the different levels of risk for standard supply chain activities that all supply chain managers, actually all managers in general, should be concerned about. |
| CROFT: 03:10 | Okay. And the risk index for supply chain is based on data you're receiving from supply chain professionals throughout the United States. Can you talk a little about who these supply chain professionals are and how you got them to take part in this index? |

ZACHARIA: 03:26 So our Center for Supply Chain [Research] here at Lehigh University has over 6,000 professionals who receive our newsletters, who have been involved in the two conferences we hold every year or the supply chain career fairs that we hold for our students. However, for the LRMI, we partnered with the biggest industry association that is specifically focused in the supply chain area, and that is the Council of Supply Chain Management Professionals, CSCMP, who helped send out our survey to their members and encouraged them to fill this out. So this helps ensure we have a broad area of companies and industries and managers represented throughout the US in developing the LRMI.

CROFT: 04:14 And I take it, in terms of the diversity of the companies and industries represented, you have large, small companies, a lot of different kinds of things that they're making and delivering.

ZACHARIA: 04:29 Absolutely. In our LRMI report, we always have a demographic section that gives you an idea of the broad range of industries. We've got companies that are 5,000, 10,000 employees all the way down to 100 employees. So there's a need for having that kind of range so that you can get the perspective of managers who have a different view of risk in their own particular area. Same thing in terms of industries, again, a broad range that helps us more accurately estimate what logistics managers, or managers in general, are seeing for supply chain risk going forward.

CROFT: 05:11 Looking at the new fourth quarter risk index that just came out, what are some of the main takeaways that supply chain managers should glean from it, and how can LRMI help them do their jobs better?

ZACHARIA: 05:24 So the LRMI report helps companies identify what risks are more likely to increase, and there are many different risks that supply chain managers can focus on. And by using this report, you can identify which risks are more critical or more important to look at. So there are three parts of the report you really need to look at. First, there is what we call the average risk, which is an average of the 10 different categories of risk. In the third quarter, it was 69.49. It is now 66.97. So the one idea you get out from between the third quarter and the fourth quarter is that logistics managers, supply chain managers are seeing that the overall risk has decreased. The second idea that you get out of the LRMI report is when we actually ask the supply chain managers to compare the risks head to head. And in this case, in the third quarter, the four biggest risks when compared head to head was economic risk, supplier risk, customer risk, and transportation disruption risk. The top four risks in the fourth quarter, however, according to supply chain managers, is again economic risk, but now operational risk is second, customer risk, and supply risk. So this means that supply chain managers have felt that operational risk has increased significantly in comparison to transportation risk. So that's the second aspect of the report. The third aspect of the report is really looking at the different kinds of risks and see how the numbers have changed from one quarter to the next.

CROFT: 07:07 Let's drill down a bit with the new numbers. First, how significant is the 2.5 point decrease in overall risk from 69.49 to 66.97?

ZACHARIA: 07:20 So this is significant in a sense-- remember we're aggregating or taking an average of 10 different numbers across all of these risks. So when you have a decrease, in this case, of 3, that is significant. It shows that there is a significant difference between the two. Now, clearly, if it had been 10, or if it had been all the way down to 50 where there is no risk, that obviously means even more. But because this is averaged over these large numbers and because we are looking at proportions, the decrease from 69 to 66 is a signal that most supply chain managers are saying that the fourth quarter is less risky than what the third quarter was.

CROFT: 08:09 And what are the main factors that go into transportation disruption risk, and how much did the index drop in this report?

ZACHARIA: 08:17 Some examples of the transportation disruption risks are fuel prices, driver shortage, if there is volatility in terms of infrastructure demand. And to compare the risks between this quarter and last quarter, so last quarter, transportation risk was relatively high at 77.27, but this quarter, it dropped down to 69.6. So the strong indication from that is is that supply chain managers are perceiving that, even though it's still very risky, it has dropped in risk. So they are able to get trucks that they need to actually deliver products, but still overall it's still relatively risky.

CROFT: 09:00 Okay. And the same question for operational risk, which went the other way. What are the main factors that go into that, and how much did the index increase this time?

ZACHARIA: 09:10 Operational risk are things that have to do with the actual operations. And some examples of that is that if you had product counterfeiting or you had issues with your actual production process, things that actually go into sort of running the plant. And the operational risk last time, in the third quarter, was 66.48, and this time, it's 60. So again, it's sort of gone down, not as much as transportation risk, but again, companies are seeing that they're able to produce products in their manufacturing plant. They view it as less risky in the fourth quarter than what they had in the third quarter.

CROFT: 09:51 Can you briefly discuss the main factors that go into the three categories that remained in the top four: economic risk, customer risk, and supplier risk?

ZACHARIA: 10:00 Economic risk has been number one pretty well in both the third quarter and the fourth quarter. So economic risk are things like increasing energy costs, commodity price volatility, labor shortages, sudden demand shocks, global energy shortages. So economic risk is really anything that directly relates to the economy. And so if you look at it in the third quarter, it was 79.89, very, very high, and in this quarter, it was the highest at 78.26. So in that case, there really was no change. Supply chain managers are concerned about the economy, and clearly it is a significant area of risk. Jack, what was the second one you'd said? I'm sorry.

CROFT: 10:51 Customer risk.

ZACHARIA: 10:53 Okay. So customer risk examples are fast changing customer demand, easy to lose customer loyalty, changing customer base demographics, hard to predict customer behavior, hard to service customers. And in the third quarter, the customer risk was 81.81, and in this quarter, it actually dropped significantly. It went from 81 down to 70. So this is an example, again, of a risk that supply chain managers are seeing has dropped. And even though it's still risky - remember 50 is where there is no risk - you're 20 points above it. People are not quite as panicky as before. There are customers, and they are able to meet their needs.

CROFT: 11:40 Okay. And the third one is supplier risk that's in the top four.

ZACHARIA: 11:45 Supplier risk examples are if you have a single or sole source supplier, you have all your suppliers located in one location, your suppliers are hard to be able to produce quality products, there's a lot of price volatility, the supplier is exposed to a lot of geopolitical shocks. So these are all kinds of things-- risks associated with getting products made from your supplier. And in the third quarter, it was 75. In the fourth quarter, it was 74.38, essentially the same. The risks in supplier risk is high, being over the 70s. And so supply chain managers still view a lot of volatility with ensuring that their suppliers are producing product. In fact, one of the executives that I actually interviewed about this, they went on record to explain to me that they are concerned that many of their smaller suppliers might face bankruptcy. So they're taking measures to make sure that those suppliers remain solvent. And so these are the kind of things that companies are starting to do to look at their entire supply chain to make sure they can produce the product that's needed to meet their own customer demands.

CROFT: 13:01 Now, besides supply chain managers, are there things that other businesses and even consumers can take away from the risk index?

ZACHARIA: 13:09 Absolutely. Clearly, supply chain managers are not the only ones that have to look at risk and have to look at, "Do we need to build in some redundancy because there is somewhat risk associated with this?" And clearly, managers all along within companies have to look and see whether they're going to hire more employees, have a redundant supplier, maybe locate suppliers in different locations, and look at their opportunities to sell their product, look at their marketing side. Financial managers have to look at what kind of investments should they make because they're all looking at these kinds of risks. So when you look at the index as a whole, again, it gives you an idea of where you should focus your limited time and resources on. So the index gives you a sense of what is important, and I think it's important for managers within companies to necessarily understand that. Now consumers, if they could perhaps look at the risk and they could perhaps say that there's a risk that, "My suppliers are not going to be able to produce the kind of products that I need, that I'm looking to buy as a consumer," I guess so. But it really is made for business managers. This is more of a business-to-business kind of index and not directly visible to the consumer.

CROFT: 14:38 All right. We've talked about five of the risk categories that rose into the top four in either the third or the fourth quarter report. So let's talk about the remaining five categories you had mentioned. What I'd like to do is go through them in a lightning round, if you will, and just briefly talk about some of the same things that we've talked about with the others, which is what the category entails with some examples of what the potential risks are. So looking at these, let's start with the quality risk category.

ZACHARIA: 15:12 So examples of quality risks are lack of sufficient quality testing, changing quality standards, poor quality control documentation, product recalls. These are all examples of where you could have a problem with quality. And in the third quarter, it was very, very low risk. It was 55.68, which is just barely above no risk. And in this case, it stayed about the same. It's 56.80, which is, again, the lowest risk. So supply chain managers don't perceive there is really any change in quality of the products that they're getting.

CROFT: 15:51 Okay. And the next one is one that's in the news a lot, which is cybersecurity and data risk.

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| ZACHARIA: 16:00 | Okay. So cybersecurity examples include things like cyber attacks, data corruption, data theft, system viruses, hardware/software security issues. And so cybersecurity risk was 69.89 in the third quarter, which is very high. And then cybersecurity in the fourth quarter has gone up to 72.13. So this is suggesting that supply chain managers are now believing that there is greater cybersecurity risks in the fourth quarter than there was in the third quarter. And one obvious reason is that more people are working from home, and you cannot ensure that your home network is as safe as a company network. And I believe that the executives that I've talked to, this is a concern. And so they are investing in more technology to try and protect the workers who are working from home. |
| CROFT: 17:04 | The next one is the technological or competitive risk. |
| ZACHARIA: 17:09 | So definitions of technological or competitive risks are things like having a replacement technology or disruptive technology that replaces the technology you're using, new competitors coming into the marketplace, or you have non-existent regulations or ineffective regulations for competitors who could perhaps steal your IP, your intellectual property, in this sense. And so technological risk in the third quarter was 54.55, and in the fourth quarter, it's 58.26. So there was a marginal-- again, a 3 point increase going from the third to the fourth quarter. So it suggests that supply chain managers do see this as more risky. But remember, you always need to compare that risk to other risks, the top four risks. So if there is a little bit more competitive risk in the marketplace, or the perception, but still it doesn't match some of the higher numbers that are into the 70s and so on. |
| CROFT: 18:16 | Right. And government intervention risk is still hovering right around 70 in both the third and fourth quarter reports, not signaling any significant change, but what are some of the things they're looking at in terms of how the government may intervene in the coming quarter? |
| ZACHARIA: 18:37 | Right. So the examples we used were things like having new regulations, having tariffs, having trade wars, and clearly, all of those things have a direct effect on us doing business. And if you're looking at the news, it is clear that there is a lot of tariff issues, cross-border issues that are going on. World trade, push towards globalization has clearly slowed down. Now, you're actually right that the numbers have stayed virtually the same since they're both right at 70. But remember, 70 is a high number relative to 50. So therefore, the risks have not changed, but you could really say the risks have been high in both the third quarter and the fourth quarter. |
| CROFT: 19:26 | And the last category we haven't talked about yet is environmental risk. What are some of the things that would be involved in that? |
| ZACHARIA: 19:34 | So examples of environmental risks are natural disasters, extreme weather, industrial accidents, per se, and what do supply chain managers view as a risk that's associated in terms of environment. And so last time, in the third quarter, it was 64.20. It has dropped by, again, 4 or 5 points. So there is a significant drop in this quarter. You're looking at around 59.13, which is-- there is some increased risk but clearly not the risk of some of the other ones. So people are aware of the environment, but they don't view it as important risk to watch out for like, for example, dealing with your suppliers or your customers and so on. |

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| CROFT: 20:22 | Looking at the 10 categories that are involved in this, there's obviously a lot of moving parts, things that can go wrong, things to look out for. So if this marks the official launch of the LRMI, I wonder, as the quarters and years go by over time, what will the cumulative effect of all the data you're collecting be? |
| ZACHARIA: 20:43 | Well, one of the things that is relatively evident is that whenever you look at data, you're always looking to see if there is a pattern or a trend. Are there some cyclical relationships that underlie the data that you're not aware of? The beauty of collecting data over time is that you can actually start to see if there's some correlations, if there's some factors that affect multiple levels of supply chain risk at the same time. So once we collect the data and we can actually start to look at the data over multiple quarters, we can do much, much more sophisticated analysis to see the level of significance, for example, between one quarter to the next for a particular risk, or to see if there is a correlation between one type of risk or another. So all of these things will, again, help the supply chain manager in getting a sense of what they need to focus on with their limited time and limited, let's say, economic resources, what areas they need to focus on to make sure they're prepared for the kind of risks that they expect to see in the upcoming quarter. |
| CROFT: 21:59 | Finally, is there anything else you think our listeners should know about the Lehigh Business Supply Chain [Risk] Management Index that I haven't asked you about today? |
| ZACHARIA: 22:09 | Well, there's a couple of things. One, I would strongly encourage our listeners to go to our website and download the entire report because it's got all of this listed. There's also something that I found very fascinating, and that is the comments that people actually post based on every single risk. And the comments by themselves can be very, very insightful. At this particular point in time in our report, we summarize and we take 5 or 6 comments. But in some of these cases, I've gotten 20 or 30 comments, which gives the listeners, the people who are actually using the report, a more nuanced and deeper understanding of what exactly the risks that they're looking at. So this is more than just a number. So I would strongly encourage our listeners to go to our website and look at the reports that we're actually producing so you get to see the whole data. The other thing I'd like to do is encourage our listeners who are interested in learning more about this, and perhaps adding their perspective to this survey as a whole, is to add their name to our mailing list and be willing to respond to a short survey once a quarter so that they can add their voice about what they perceive is the changing risks in the economy with their customers, with their transportation providers, in the environment. So this helps them see the answers that they're looking for and also helps us create a more robust and more generalizable kind of index. |
| CROFT: 23:59 | I want to thank our guest, Zach G. Zacharia, for being with us. And I look forward to talking with you again, Zach, in December when we'll look ahead to the first quarter of 2021. After this year, I know a lot of us are looking forward to 2021. As Director of the Center for Supply Chain Research at Lehigh, Dr. Zacharia and the faculty and students at Lehigh Business are generating new ideas for education and future knowledge in the field of supply chain management. For more information on the Lehigh Business Supply Chain Risk Management Index, please go to [business.lehigh.edu/LRMI](business.lehigh.edu/LRMI). This podcast is brought to you by ilLUminate, the Lehigh Business blog. To hear more podcasts featuring Lehigh Business thought leaders, |

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