THINK TANK

Flock of New Resilience Tools Could Clip the Wings of Future Black Swans

Since the start of the Covid-19 pandemic, hundreds of thousands of businesses have gone under, tens of millions of people have lost their jobs and over a million individuals have perished. Covid-19 is not just another black swan event, but the heavy-weight champion of all Black Swans.

While black swan events are, by definition, unpredictable, Professor and Director of the MIT Data Science Lab David Simchi-Levi believes enterprises can better position themselves to outmaneuver the uncertainty of future supply chain disruptions by instituting more sophisticated risk management tools that proactively stress test extended supply networks. To make this capability more widely accessible across industries and companies of all sizes, Simchi-Levi recently announced a collaboration (https://www.accenture.com/us-en/services/supply-chain-operations/resilient-supply-chain?c=acn_glb_supplychainresimediarelations_11636094&n=mrl_1020) between MIT and management consultant Accenture on the development of a Supply Chain Resilience Stress Test. This initiative is among a gaggle of new data-driven, digital supply chain risk management tools launched in the wake of the massive disruptions prompted by the Covid-19 pandemic. Other entries into the space in recent months include offerings from management firms Kearney (https://www.kearney.com/communications-media-technology/article?/a/creating-resilience-in-technology-supply-chains), EY (https://sbr.com.sg/co-written-partner/more-news/ey-procurement-global-leader-shares-insights-building-supply-chain-resi) and McKinsey (https://www.mckinsey.-

com/business-functions/operations/our-insights/why-now-is-the-time-to-stress-test-your-industrial-supply-chain).

The initiative is among a gaggle of new data-driven, digital supply chain risk management tools launched in the wake of the Covid-19 pandemic.

Utilizing supply chain digital twin technology and comprehensive AI/scenario testing capability, the MIT/Accenture model allows users to not only identify potential vulnerabilities, but devise an actionable mitigation strategy, regardless of the cause of the disruption or where it strikes. This capability, Simchi-Levi contends, could have made an "enormous difference" in businesses' response to the pandemic disruption had it been more widely implemented before the pandemic hit.

Key Concepts
1. **Risk Exposure Index™ (REI):** Method to prioritize the financial impact of risk. 2. **Time to Recover (TTR):** The time it takes a particular node — a supplier facility, a distribution center, or a transportation hub — to be restored to full functionality after a disruption. 3. **Time to Survive (TTS):** The maximum duration that the supply chain can match supply

"Why am I so sure? Because I first developed the foundational components of this model – time to survive, time to recover and risk exposure – for Ford back in 2013," he explained. "And not only has Ford been successfully executing this model for years to assess risk throughout their supply chain, but they have publicly stated throughout this disruption that they are using these assessments to make critical decisions around mitigation strategies, such as when to expedite, when to scale production, etc."

The MIT/Accenture stress test solution is pre-loaded with 40 scenarios, simulating incidents such as sudden spikes or drops in demand, the shutdown of a major supplier or facility, scarcity of a critical raw material, or disruption of a key port. These scenarios are standardized but can be modified to include company-specific variables, Simchi-Levi noted. "Because the scenarios are standardized, organizations both in the public and private sector will be able to benchmark their resilience against peers and competitors across industries." The test is also designed to be scalable and adaptable to changing market conditions and customer expectations as supply chains continue to evolve, he added.

"With resiliency it is much less clear how to measure and how to determine the return on investment."

Simchi-Levi said he hopes the MIT/Accenture Supply Chain Resilience Stress Test will make it possible for a broader range of enterprises to more effectively identify and mitigate supply chain risks. "I have done work with many different companies in this space over the years and have seen so many companies struggle to define and measure KPIs around resilience. If you are in charge of cutting cost, it is easy to measure and easy to understand. If you are in charge of increasing revenue, easy to measure, easy to understand. Supply chain practitioners may know that they need to find a better balance between resiliency and efficiency, but with resiliency it is much less clear how to measure and how to determine the return on investment."

As a result, too many companies simply stock up on inventory and hope for the best. But as acclaimed Hollywood Director James Cameron said about his infamous search for the Titanic wreck, "hope is not a strategy."

"Just in case is just one strategy that may be implemented, but inventory is not always the best answer," said Simchi-Levi. The Supply Chain Resilience Stress Test is designed to shift an organization's risk management focus from trying to guess the likelihood of infrequent, high-impact events to concentrating on evaluating their vulnerability to disruptions and to identifying mitigation strategies, Simchi-Levi noted.

Currently the MIT/Accenture team is focusing the initial framework build on three industries deemed critical to national security: food, healthcare and life sciences. However, Simchi-Levi expects to broaden the offering over time and hopes to eventually expand the scope of the tool from strategic decision making to support for more tactical and operational decisions.

"The bigger vision I have is to start as a resilience strategy, but eventually penetrate tactical and operational decisions so it can ultimately help companies cut cost," he said. "For example, if we integrate this technology with corporate IT, as we did with Ford, companies can get weekly information about lead time, supplier forecasts and generate resiliency reports. The program will tell them, for example, if this week lead time from a specific supplier has increased dramatically, or inventory positions are shifting, etc. This gives supply chain leaders the ability to identify potential or emerging issues much earlier."

If more companies follow through on their commitments to be “better prepared next time,” perhaps Covid-19 could be the swan song for supply chain black swans.

The output of this system would not be standard KPIs, which simply provide current status, but a category of metrics Simchi-Levi calls Key Performance Predictors. “KPPs are forward looking,” Simchi-Levi explained. “So, if your lead time is increasing, the KPP will tell you that you may have a problem in two weeks.”

Integrating stress test technology into existing ERP/IT structures could also help organizations operationalize this resilience mindset and, hopefully, avoid the seemingly inevitable scenario we have seen play out innumerable times over the years: after a crisis passes, the impact of the jolts invariably fade, and so does the urgency around supporting more proactive supply chain risk management investments. If this bevy of new supply chain stress test capabilities does indeed inspire and enable more companies to follow through on their commitments to be “better prepared next time,” perhaps Covid-19 could be the swan song for supply chain black swans.

Related Resources:

- OnDemand Webinar: (https://www.youtube.com/watch?v=XfOSoa5X62w&list=PLKaF-rnKfpxODFknQsd8UVCeBYP5w3ZGS&index=3&t=0s) From Pandemic Disruption to Global Supply Chain Recovery, featuring David Simchi-Levi
- HBR: (https://hbr.org/2020/06/building-resilient-supply-chains-wont-be-easy?utm_medium=email&utm_source=newsletter_daily&utm_campaign=dailyalert_not_activesubs&deliveryName=DM85312) Building Resilient Supply Chains Won't Be Easy
- HBR: (https://hbr.org/2020/04/we-need-a-stress-test-for-critical-supply-chains) We Need a Stress Test for Critical Supply Chains
- HBR: (https://hbr.org/2014/01/from-superstorms-to-factory-fires-managing-unpredictable-supply-chain-disruptions) From Superstorms to Factory Fires: Managing Unpredictable Supply-Chain Disruptions
- Alliance: (https://news.mit.edu/2020/accenture-bolsters-support-technology-innovation-through-new-mit-wide-initiative-1026) MIT and Accenture Convergence Initiative for Industry and Technology