New research may help to reduce global supply chain disruptions

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(PhysOrg.com) -- With consumer spending dwindling over the past couple months, retailers are hoping to see it increase with the holiday shopping season. In order to seize the opportunity and boost sales, retailers need to ensure on-time product delivery from their suppliers. Now that more companies rely on global sourcing, they need to avoid disruptions in the supply chain and mitigate the various risks involved.

Christopher Craighead, assistant professor of supply chain management at Penn State's Smeal College of Business, along with co-authors Jason Deane and Cliff Ragsdale from Virginia Tech, has devised a two-phase approach that enables firms to potentially decrease the negative impact of disruptions in the supply chain. In their study, "Mitigating Environmental and Density Risk in Global Sourcing," the researchers develop a decision support model that complements traditional supplier selection tools by considering risks associated with global sourcing.

"We want to get across the concept of considering risks on the front end by demonstrating how risks could be incorporated into the supplier selection decision," said Craighead. He added that managers need to take into account risk issues while deciding on suppliers and key points of distribution, not after the supply chain decisions have been made.

With the intention of complementing traditional models, the researchers' two-phase supplier approach suggests potential suppliers are filtered based on their performance with respect to traditional selection factors, like price, quality, service, and delivery. As a second step, they propose a

model used to consider the risk issues of each supplier.
"We believe our tool should be used in conjunction with traditional criteria, using the traditional selection criteria to establish a threshold and ours to make the final supplier selection," wrote the researchers, who added that their approach reduces the risk of severe disruptions.

Their method allows for the analysis and mitigation of two key global risk measures, environmental and density risk, when selecting suppliers for critical products. When selecting a supplier, a manager selects the supplier's environment as well. Therefore, each potential supplier is assigned an environmental risk index, which captures issues such as political instability, infrastructure issues, economic problems, or potentially severe weather that could introduce uncertainty in the supply of parts from that region.

"A disruption affecting a dense supply base (suppliers in close proximity to one another) could be quite severe as many, and perhaps all, of the suppliers could be affected," said Craighead, who suggests suppliers should spread out or diversify suppliers so they're exposed to different levels of risk.

Craighead and his co-authors also cite prior survey research which shows that most executives acknowledge supply chain disruption as one of their largest organizational risks even though a large percentage of them don't know what to do about it.

"They must recognize and manage their new risk profile and consider new risk factors in supply chain decisions, such as the process of analyzing and selecting suppliers," they wrote. "Although it would need to be adapted to the nuances of company supply chains, we believe our tool provides value to managerial decision making relative to the sourcing of mission critical parts and products."

The researchers also address the growing alarm surrounding the area of supply chain risk and disruption in the documented concern from executives, the dollar losses incurred, and its overall effect on performance in the supply chain.
"When a firm chooses to source globally, disruptions are unavoidable and therefore, it's not a matter of if, it's a matter of when," Craighead said.

When facing potentially severe disruptions, firms who consider the risk issues of each supplier have a competitive advantage over those who do not and are better equipped to reduce the costliness of the disruption.

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