Developing Resilient Supply Chains During a Pandemic

Research overview

In times of crises such as pandemics, movement restrictions and lockdowns often disrupt manufacturing and logistics globally. A literature review explored how disruptions in supply chains have been dealt with during past crises.

The study recommended a synchronized truck-drone delivery system to facilitate the rapid and safe last-mile delivery of food and medicines in infection hot zones. This system comprises an algorithm to optimize truck parking locations and drone flying paths to and from the trucks, such that cost is reduced and efficiency is increased.

A simulation model of the operations of India's Public Distribution System—the government's essential food supply chain for people from socioeconomically weaker sections—was created. The model simulated three scenarios: normal conditions, one central warehouse shut down due to the pandemic, and a backup warehouse present.

The study found that maintaining a backup warehouse at a strategic location and using large trucks with big capacities were key to maintaining the required service levels despite disruptions.

Why is it important?

Increasing infections and movement restrictions due to lockdowns caused manufacturing and logistics to be suspended across economic sectors globally, leaving essential demands unmet and highlighting supply chain design weaknesses. It is important to find ways to make supply chains disruption-resilient to not only restore the economy during the COVID-19 pandemic but also plan for future crises.

Key takeaway

These models of distribution and delivery could help develop resilient supply chains and support decision-making based on movement restrictions and resource availability.

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