

## **SUPPLY CHAIN RISK ANALYSIS**

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*The aim of this research is to investigate how to identify risks and to take into consideration their potential impact on the supply chain.*

It is necessary to highlight supply chain risk management as an important area of investigation in operations and supply chain management.

Supply chains are exposed to a variety of risks related to actions and events that are inside and outside of the supply chain. Supply chain risk analysis seeks to identify these risks, their sources and drivers, and their impact on the supply chain.

There are definite supply chain's key locations and associated with them losses:

- Human resources: death, injury, illness, etc.
- Product/inventory: theft, damage, contamination, lost sales, stockouts, etc.
- Physical assets: plants, warehouses, equipment, vehicles, etc.
- Public infrastructure: electric, water, gas utilities, bridges, ports, roads, etc.
- Information: loss of data, access, processing capabilities, etc.
- Financial: theft, counterfeiting, stock prices, etc.

The common supply chain vulnerability drivers can be categorized into next groups: disruptions in supply, volatile demand, operational constraints and limitations and external forces.

Using graph theory vulnerability drivers can be considered as vertices and the inter-dependencies between them as edges. So we have a graph plotted for a specific supply chain.

Having assigned some expert weight and direction to the edges we get a weighted directed graph. Its adjacency matrix can be applied to estimate the level of supply chain vulnerability.